CONSTRUCTION STANDARD SPECIFICATION

SECTION 13852

INTELLIGENT FIRE ALARM SYSTEM

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INTELLIGENT FIRE ALARM SYSTEM

PART 1 -GENERAL

1.01 SUMMARY

A. Design/build, install, test and place into service an addressable intelligent fire alarm system per the requirements of this Section and NFPA 72. The system shall include a control panel, alarm initiating devices, notification appliances, and the accessory equipment necessary for a complete functioning fire alarm system.

B. The fire alarm control panel (FACP) will transmit signals via a Digital Alarm Communicator Transmitter (DACT) to Sandia's fire alarm Proprietary Supervising Station, hereafter referred to as Central Station, utilizing dedicated phone lines. The communication format for the DACT shall be Ademco Contact ID. The phone lines at the building service entrance and the programming at the Central Station will be provided by Sandia.

C. This Section includes the requirements for modifications made to existing conventional and intelligent fire alarm systems reporting by DACTs to the SNL Central Station.

D. This Section includes the requirements for the design and installation of fire alarm systems in prefabricated office units.

1.02 REFERENCES

A. The current editions of the following standards are part of this Section:

1. NFPA 70 - National Electrical Code
2. NFPA 72 - National Fire Alarm Code
3. NFPA 75 – Standard for the Protection of Information Technology Equipment
4. NFPA 90A - Installation of Air-Conditioning and Ventilating Systems
5. NFPA 318 – Standard for the Protection of Semiconductor Fabrication Facility
6. International Fire Code
7. International Building Code

B. Related Construction Standard Specifications

1. Division 1, Section 01330, "Submittal Procedures".
2. Division 7, Section 07270, "Firestop and Smokestop Systems".
3. Division 9, Section 09900, "Painting".
4. Division 16, Section 16001, "Electrical Work".

C. Related Standard Drawings:

1. E-0006STD, "Standard Symbols List & General Notes".
2. FA7001STD, "Fire Alarm Wiring Diagrams".
3. FA7002STD, "Notification Appliance Wiring Diagrams".

D. SNL Facilities Design Standards Manual

E. Conflicts between the references and this Section shall be referred to the Sandia Delegated Representative (SDR) who will determine which standard shall govern.

1.03 SUBMITTALS

A. General Submittal Requirements:

1. Provide one copy of the following submittals for approval by the SNL Fire Protection Engineer:

a. Pre-Construction Submittals

(1) Equipment Data Sheets

(2) Shop Drawings

(3) Calculations

(4) Qualification Data

b. Pre-Acceptance Test Submittals

(1) As-Built Shop Drawings

(2) Fire Alarm Control Panel Programming

(3) Completed "Fire Protection Systems – Request for Acceptance Testing" form.

(4) Completed "Fire Alarm System - Quality Assurance Checklist".

(5) NAC Decibel Test Results (one copy to SNL FPE)

c. Contract Close-Out Submittals

(1) Record of Completion

(2) Electronic copy of the as-built FACP programming.

(3) Electronic and hard copy of the as-built shop drawings.

2. Approval of submittal by the FPE is required prior to proceeding with the installation of the fire alarm system.

B. Equipment Data Sheets:

1. Equipment data sheets shall be submitted for all equipment and devices used in the fire alarm system. Identify the specific model or part that will be installed on the submittal. If options are listed on the data sheets, the specific option for the project shall be clearly marked. The equipment submittals shall include but not be limited to the following:

   a. Fire alarm control panel and components.

   b. Batteries and enclosures.

   c. Notification appliances, including NAC power supplies.

   d. Initiating devices.

   e. Addressable modules, including isolating modules.

   f. Filters or surge suppression devices.

   g. SLC, NAC, and IDC cables

   h. Annunciators.

   i. Voice evacuation components.

C. Shop Drawings:

1. Submit shop drawings using either AutoCAD or Bentley MicroStation. If using MicroStation, following the requirements in the Facilities CADD Standards Manual for preparing drawings.

2. For drawings prepared and reviewed by a NICET certified designer, provide copies of the NICET certificates with the drawings submitted for approval. For drawings prepared and reviewed by a registered professional Fire Protection Engineer, the drawings shall be stamped with the engineer's stamp.

3. Floor Plans: Provide the following information on fire alarm floor plans:

   a. All fire alarm component equipment and device locations, including location of addressable modules.

   b. Indicate SLC address for all devices and addressable modules (e.g., D015, M126). If there is more than one SLC, indicate loop number with address (e.g., L2D015, L1M004).

   c. Location of notification appliance power supplies with identification label (e.g., PS1, PS2, etc.).

   d. Identify notification appliances on shop drawings using the format Power Source – Power Source Output, where:
      (1) Power Source = N if powered from FACP; PS1 if powered from NAC Power Supply PS1.

(2) Output = The output from the power source, for example 1 or 2 if powered from the FACP NAC1 or NAC2 outputs; or 1 to 4 for the Wheelock PowerPath outputs.

e. Show routing of conduit and J-boxes to be installed.

f. Show location and identification of power panels on plans that will be powering fire alarm system load. Indicate branch circuit number(s) utilized by fire alarm equipment.

g. Conduit sizes: Provide a general note stating "Fire alarm conduit shall be sized as follows: ½" for 1 to 2 fire alarm cables and 120 VAC circuits; and ¾" for 3 or more fire alarm cables, unless noted otherwise on plans or per the NEC requirements for cable fill in raceways".

h. Cable and wire types and sizes.

4. Fire Alarm Riser Wiring Diagram: Provide the following information on the fire alarm riser wiring diagram drawing:

a. Each FACP, annunciator, initiating device, addressable module, and notification appliance with the address or identification number for each device and the location of each device.

b. Locate all initiation devices and notification appliances on the riser diagram to reflect the general location in the building by floor, building section/wing, etc.

c. Notification appliance power supplies.

d. Device-to-device schematic wiring diagram.

e. All addressable modules and the devices/equipment they are monitoring or controlling (e.g., flow switches, tamper switches, release panels, HVAC fans, dampers, elevator recall).

f. The 120 VAC panel and circuit number for each fire alarm power circuit.

g. Cable and wire types and sizes.

5. Control Ladder Diagrams: Provide the control ladder diagrams for non fire alarm building systems that will be controlled by the fire alarm system to indicate interface with addressable relay modules.

D. Calculations:

a. Batteries: Battery size calculations to provide 24 hours supervisory, 5 minutes alarm secondary backup power.

b. NAC Calculations: Load and voltage drop calculations for each NAC.

c. SLC Loop Calculations: Provide calculations to verify that the SLC loop is not exceeding the maximum permissible length or loop current per the fire alarm equipment manufacturer's specifications.

E. Qualification Data:

1. Fire Alarm System Designer: Provide documentation verifying compliance with the requirements listed below.
    a. Designer shall, as a minimum, be NICET Fire Alarm Level III certified, or a Registered Professional Fire Protection Engineer in the State of New Mexico.
    b. Designer shall be factory trained and certified for the manufacturer's fire alarm equipment being installed.
2. Fire Alarm System Installer: Provide documentation verifying that the Fire Alarm System Installer lead technician is factory trained and certified to install the fire alarm control panel and associated equipment being installed.

F. Pre-Acceptance Test Submittals:

1. As-Built Shop Drawings: Provide to the SNL FPE a full size copy of the as-built shop drawings for verification of the fire alarm installation during the Acceptance Test.
2. NAC Decibel Test Results: Note the NAC decibel values for each room in the building on floor plans and deliver to the SNL FPE prior to Acceptance Test for verification that proper NAC decibel levels are achieved for evacuation of building occupants.
3. FACP Programming: Submit the FACP programming by e-mail to the SNL FPE for review by the SNL FPE prior to the Acceptance Test and for use to perform programming at the Central Station.
4. Acceptance Test Forms:
    a. Complete the "Fire Protection Systems – Request for Acceptance Testing" form in Attachment 7 and deliver to the SCO.
    b. Complete the "Fire Alarm System - Quality Assurance Checklist" form in Attachment 8 and deliver to the SCO.

G. Contract Closeout Submittals:

1. Record of Completion: Provide to the SNL FPE the "Record of Completion" for the completed system according to NFPA 72 at the conclusion of the system acceptance test. Upon satisfactory completion of the acceptance test, the "Record of Completion" shall be signed and dated by the AHJ. The approval date on the Record of Completion shall document the start date for the fire alarm installation warranty period.
2. FACP Programming: Submit the as-built FACP programming by e-mail to the SNL FPE.
3. As-Built Drawings: Provide one (1) full-size and ½ size hardcopy; and the electronic AutoCAD file for the as-built shop drawings to the SNL FPE.
4. Provide the electronic media of the as-built drawings to the Sandia CADD Coordinator for incorporation into the SNL Document Management System.

1.04 QUALITY ASSURANCE

A. Fire Alarm System Designer Qualifications: The designer of the fire alarm system shall meet the requirements listed below.

1. Certified, as a minimum, NICET Fire Alarm Level III, or a registered professional Fire Protection Engineer in the State of New Mexico.

2. Factory trained and certified for the manufacturer's fire alarm equipment being installed.

B. Fire Alarm System Installer Qualifications: The lead technician installer is factory trained and certified to install the fire alarm control panel and associated equipment being installed.

C. Electrical Components, Devices, and Accessories:

1. All equipment and devices furnished shall be Factory Mutual (FM) approved or Underwriter Laboratories (UL) listed, unless specifically noted otherwise.

2. Approved or listed equipment shall be so noted in the latest edition of the FM Approval Guide or the UL Fire Protection Equipment Directory.

3. All initiating devices, addressable modules, and voice evacuation equipment shall be UL listed for use with the FACP.

1.05 DEFINITIONS

A. DACR: Digital Alarm Communicator Receiver

B. DACT: Digital Alarm Communicator Transmitter

C. FACP: Fire Alarm Control Panel

D. FATC: Fire Alarm Terminal Cabinet

E. Fire Safety Functions: Building and fire control functions that are intended to increase the level of life safety for occupants or to control the spread of the harmful effects of fire.

F. FPE: Fire Protection Engineer(ing)

G. IDC: Initiating Device Circuit

H. IDR: Intermediate Distribution Room (building red/black communication room)

I. NAC: Notification Appliance Circuit

J. NICET: National Institute for Certification of Engineering Technologies

K. SCO: Sandia Construction Observer

L. SLC: Signaling Line Circuit

M. SNL: Sandia National Laboratories, Albuquerque, New Mexico

N. Definitions in NFPA 72 apply to fire alarm terms used in this Section.

1.06 SYSTEM DESCRIPTION

A. Comply with NFPA 72 requirements.

B. The fire alarm control panel shall include the following capabilities:

1. Communicate with Sandia's Central Station DACR using a DACT with Ademco Contact ID communication format.

C. Field Wiring:

1. Signaling Line Circuits (SLC) shall be wired as NFPA 72 Class A, Style 7.
2. Initiating Device Circuits (IDC) shall be wired as NFPA 72 Class A, Style D.
3. Notification Appliance Circuits (NAC) shall be wired as NFPA 72 Class B, Style Y.

D. Fire alarm signal initiation shall be by one or more of the following devices:

1. Manual pull stations.
2. Heat detectors.
3. Photoelectric smoke detectors.
4. Automatic sprinkler system water flow detection switches.
5. Automatic sprinkler system pressure switches.
6. Air sampling control panels.
7. Fire suppression release panels.
8. UV/IR detectors.

E. Fire alarm signal shall initiate the following actions:

1. Alarm notification appliances shall operate continuously.
2. Identify alarm at FACP and remote annunciators.
3. Transmit an alarm to the Sandia Central Station.
4. Unlock electric door locks in designated egress paths.
5. Recall of elevators.
6. Release fire doors held open by magnetic door holders.
7. Close fire/smoke dampers.
8. Switch HVAC equipment controls to fire alarm mode.
9. Actuate smoke removal equipment.
10. Activate power shunt-trip circuit breakers.
11. Actuate stairwell pressurization.
12. Provide an input to the Facility Control System (FCS) FID control cabinet.
13. Record events in the FACP system memory.

F. Supervisory signal initiation shall be by one or more of the following devices:

1. Operation of a fire protection system valve tamper switch.
2. Alarm activation of the flow switch on the backflow preventer catastrophic failure drain pipe.
3. Alarm activation of low-pressure alarms on dry pipe automatic sprinkler systems.
4. Alarm activation of duct smoke detector.

G. Supervisory signal shall initiate the following actions:

1. Transmit a Supervisory alarm to the Sandia Central Station.
2. Record events in the FACP system memory.

H. System trouble signal initiation shall be by one or more of the following devices or actions:

1. Open circuits, shorts and grounds of wiring for initiation device, signaling line, and notification appliance circuits.
2. Opening, tampering, or removal of alarm-initiating and supervisory signal-initiating devices.
3. Loss of primary power at the FACP (non-latching alarm with a programmed time delay prior to sending alarm to Central Station).
4. Ground or a single break in FACP internal circuits.
5. Abnormal ac voltage at the FACP.
6. A break in standby battery circuitry.
7. Failure of battery charging.
8. Abnormal position of any switch at the FACP or annunciator.
9. Failure of DACT to function properly.
10. Failure of phone lines connected to DACT.
11. Common input/output trouble, AC fail, low battery, and ground fault from the NAC power supply.

I. Notification Appliance Circuit: Operation shall sound a continuous bell tone, 1560 Hz modulated (0.07 sec. On/Repeat) or similar signal, and be capable of operating 6” and 10” polarized vibrating bells.

1.07 DESIGN CRITERIA

A. Fire Alarm Control Panel

1. Location: Install the FACP near the main building entrance in a location readily visible and accessible by emergency responders. Do not locate the FACP in locations exposed to temperature extremes.

2. AC Power: Provide a dedicated 120 VAC, 20-amp branch circuit from the nearest power panel for FACP power. Do not terminate any 120 VAC circuits inside FACP other than the 120 VAC power input to the panel.

3. Telecommunications: Provide a CAT5 telephone cable (8-conductor) in a dedicated raceway from the FACP to the building IDR for the DACT primary and secondary phone numbers.

4. Provide a pull box or wire gutter in an accessible location in the ceiling above the FACP to minimize the number of conduit penetrations into the FACP. Only field wiring will shall be installed in the ceiling space above the FACP. Refer to Attachment 1 “FACP Installation Details” for further details.

5. Provide 120 VAC Surge Protection, circuit breaker, and utility outlet; and 24 VDC battery and NAC circuit disconnect switches in the fire alarm control panel per the details in Attachment 5 “EST QuickStart FACP Modification Details” and Attachment 6 “NOTIFIER NFS-640 FACP Modification Details”.

6. Auxiliary FACP Panel: Locate NAC strobe synchronizing modules, SLC addressable modules, and surge protection devices in a panel enclosure located immediately above the FACP. Locate any relays with 120 VAC circuits that control fire safety functions (e.g., smoke removal, fan shutdown) in the Auxiliary FACP Panel or install an addressable relay module on the SLC near the equipment controls. Refer to Attachment 1 “FACP Installation Details” for further details.

7. Fire Safety Function/NAC Disable Switch: Provide a supervised N.O. switch in the FACP to allow maintenance personnel to service and test FACP with out impacting building occupants and building control systems. Program the FACP such that upon closing the switch, all NACs and fire safety functions (e.g., HVAC and elevator controls) will be disabled.

B. Manual Pull Stations

1. Location: Provide manual pull stations at the following locations:

a. Each pedestrian exit door, including equipment rooms.

b. At doors leading to stairways on floors above and below the main floor.

c. In normal paths of exit in highly visible locations so the travel distance from any point in the building to a manual pull station does not exceed 200 feet.

C. Photoelectric Smoke Detectors

1. Location: Provide photoelectric smoke detectors at the following locations:
   a. In immediate vicinity of FACP.
   b. Inside IDR.
   c. In elevator lobbies, at top of elevator hoistways, and in elevator machine rooms to initiate elevator recall.
   d. In areas not protected with an automatic sprinkler system.
   e. Within 5 feet of fire/smoke dampers installed in unducted openings.
   f. In locations required by applicable codes and standards (e.g., IBC, NFPA 75, NFPA 318).

D. Heat Detectors

1. Location: Provide heat detectors at the following locations:
   a. Within 2 feet of sprinkler head(s) in hoistways when elevator shutdown is required prior to sprinkler activation.
   b. In mechanical rooms without automatic sprinkler system protection.
   c. In locations required by applicable codes and standards.
2. Temperature Rating: Provide 190°F heat detectors in locations subject to high ambient temperatures, such as at top of high bays and in close proximity to heat generating equipment.

E. Duct Photoelectric Smoke Detectors

1. Location: Provide duct photoelectric smoke detectors at the following locations:
   a. HVAC Supply: Downstream of the HVAC air filters and ahead of any branch connections in air supply systems having a capacity greater than 2,000 ft^3/min.
   b. HVAC Return: At each floor level prior to the connection to a common return and prior to any recirculation or fresh air inlet connection in air return systems having a capacity greater than 15,000 ft^3/min and serving more than one story.
   c. Fire/Smoke Dampers: Within 5 feet of a fire/smoke damper installed within a duct with no air outlets or inlets between the detector and the damper.
   d. On supply and return HVAC ducts where required by NFPA 90A and NFPA 72.
2. Remote Test Station: Provide a remote test station for each NOTIFIER duct smoke detector and conventional duct detector. Locate remote test station in same room as near to the duct smoke detector as possible. Avoid installation of remote test stations in locations with restricted access (e.g., vaults, computer rooms).

3. Remote Alarm LED: Provide a Remote Alarm LED at the following locations:

   a. On the ceiling below each duct detector concealed above a ceiling where not annunciated by a Remote Test Station.

   b. On the outside of each EST Duct Smoke Detector Housing.

F. Modules: Provide addressable input/output modules as listed below.

1. HVAC Air Handling Units: Provide addressable relay modules at the HVAC controls unit to shutdown air handling equipment instead of using auxiliary contacts on the duct smoke detectors. Activation of a duct smoke detector in HVAC supply and return ducts shall shutdown the associated air handling unit(s).

2. Fire/Smoke Dampers: Provide addressable relay modules to close fire/smoke dampers whenever the spot-type or duct smoke detector located within 5 feet of the damper goes into alarm. Program the FACP to shutdown the associated HVAC air handling unit(s) for the damper to prevent damage to the ductwork.

3. FID Interface: Provide a relay module near the Facility Control System FID control cabinet to provide an input whenever there is a fire alarm signal impacting HVAC system operations.

4. Automatic Sprinkler System Initiating Devices: Provide individual monitor modules for each water flow, pressure switch, or tamper supervisory switch installed on the automatic sprinkler protection system. Coordinate location of monitor modules with the contractor installing the automatic sprinkler system.

5. Ancillary Control Panels: Provide individual monitor modules for each ancillary control panels (e.g., fire suppression release panels, air-sampling control panels, toxic gas detection panels, ADA area refuge phones, etc.) that requires connection to the fire alarm system for monitoring.

6 NAC Power Supplies: Provide a monitor module to supervise the NAC power supply's common trouble output.

7. Isolator Modules: Provide isolator modules on the SLC every 20-25 devices and where the SLC enters another building floor or section to protect the SLC loop from short circuits.

8. Install the FACP manufacturer's multiple input/output monitor products in locations where there are numerous devices to be monitored or wherever numerous outputs are required to reduce the wall space required by individual modules installed on electrical gang boxes.

G. Notification Appliances

1. Multitone Horns: Provide audible notification appliances throughout the building as required to achieve the decibel levels required by NFPA 72. The average and minimum decibel levels required for the various occupancies at SNL are listed below:

Occupancy	Avg. Ambient dBA	Minimum dBA Required
Office Areas	55	70
Assembly Areas	55	70
Storage Areas	55	70
Computer Rooms	70	85
Labs	70	85
Low and High Bays	70	85
Clean Rooms	70	85
Mechanical Rooms	90	105

2. Strobes: Provide visual notification appliances in all common areas (e.g., restrooms, conference rooms, break areas, corridors, hallways, stairways, lobbies), open areas with calculated occupant loads of 10 or more occupants, and in locations with a high ambient sound level (e.g., mechanical rooms).

3. Emergency Responder Appliance: At the main entrance(s) to the building, provide a weatherproof outdoor-listed strobe on the exterior wall of the building that is readily visible to emergency responders for indicating when the building fire alarm system is in an ALARM condition.

4. NAC Power Supplies: Provide NAC power supplies throughout the building, as required, to provide power for the audible/visual appliances and to reduce voltage drop on NACs. Provide a dedicated 120 VAC, 20-amp branch circuit from the nearest power panel to power the NAC power supply. Locate NAC power supplies in accessible locations for maintaining the panels, preferably in equipment chases and electrical closets or rooms. Provide a dedicated NAC cable from the FACP to connect all NAC power supply inputs to permit the disconnection of all building NACs from the FACP.

5. Zoning: The boundaries of NAC zones shall coincide with building outer walls, building fire or smoke compartment boundaries, floor separations, or other fire safety subdivision. Initially load each NAC zone with appliances that do not exceed 80 percent of the available NAC amperage to permit later addition of appliances to the circuit.

6. Voice Evacuation: If specifically required by the project scope of work, design a NOTIFIER voice/evacuation system to comply with the requirements in NFPA 72 and to interface with the SNL-NM Emergency Management Tone Alert Radio System (TARS).

H. Fire Safety Functions

1. Provide the following fire safety function controls as required by applicable codes and standards:

   a. Elevator recall/shutdown

   b. Fire door release

   c. HVAC shutdown

d. Closure of fire/smoke dampers

e. Activation of smoke removal equipment

f. Activation of shunt-trip circuit breakers

I. Raceway and Wiring

1. Raceways housing fire alarm wiring shall be ½" for 1 to 2 cables and ¾" for 3 or more cables (or sized per NEC requirements). AC power raceways shall be ½".

2. SLC, NAC, and DACT communication cables shall share the same raceway wherever possible to reduce the amount of raceway installed. NAC cables with mechanical bells or any other cable with device(s) on the circuit that will interfere with the data on the SLC shall not be installed in the same raceway as the SLC.

3. Do not install the SLC cable in the following locations:

a. Outside of the building housing the FACP.

b. Inside screen rooms or portable structures within a room.

c. Through signal filters.

J. Prefabricated Office Units Design Criteria

1. Apply the following changes in the fire alarm design criteria to prefabricated office units.

a. Plenum-rated cables will be installed above the ceiling instead of using conduit.

b. Stub conduits from the FACP up into the ceiling space. No wireway or pullbox required above FACP.

2. Smoke Detectors: Install smoke detectors to provide complete coverage protection unless a sprinkler system is installed in the units. With a sprinkler system installed, only the smoke detector in the IDR and by the FACP is required.

1.08 MODIFICATION TO EXISTING FIRE ALARM SYSTEM

A. Interruption of Existing Fire Alarm Service: Do not interrupt operational fire alarm systems until the following conditions have been met:

1. Notify the SCO no fewer than two working days in advance of proposed interruption of fire alarm system.

2. Verify that the fire alarm system notification appliances have been disabled and the FACP put in "No Action" at the Central Station prior to starting work to avoid evacuating building occupants and prevent notification of emergency responders.

3. Maintain existing fire alarm system in service during non-standard working hours and over weekends. If unable to do so, notify SCO.

B. SLC Modifications:

1. Design: The Fire Alarm System Designer shall perform the design required per the project scope of work criteria and the requirements in the design criteria section of this specification.

2. Installation: The Fire Alarm System Installer shall install and terminate the additional devices, and modify the FACP programming as required per the requirements in this specification.

C. IDC and NAC Modifications:

1. Design: Either the A/E or the Fire Alarm System Designer shall modify existing or generate new shop drawings as required to clearly delineate the work to be performed per the requirements in the design criteria requirements section of this specification.

2. Installation: The Electrical Contractor shall install the raceway, cables, and devices required per the design shop drawings. The Fire Alarm System Installer or Sandia Maintenance will be responsible for terminating all wires at the new devices and making the required modifications at the FACP.

1.09 SEQUENCING AND SCHEDULING

A. FPE Submittal Acceptance: Do not proceed with the fire alarm system installation until fire alarm submittals have been approved by Sandia Fire Protection Engineering.

B. Existing Fire Alarm Equipment: Maintain existing fire alarm equipment in service a long as possible while modifications to the fire alarm system is underway. Label manual pull stations “NOT IN SERVICE” when they are not operative. Post temporary signs ("ATTENTION – In Case of Fire Call 911") at building entryways and all stairwells when the fire alarm system is not operative or impaired in the building. Refer to Attachment 9 of this Section for sample sign that can be photocopied to use as notification of fire alarm system impairment.

C. DACT Phone Lines: Contact SCO no later than 14 days prior to final commissioning of the fire alarm system to request phone line number assignments for the DACT. The FPE will issue the paperwork necessary to obtain telephone service to the DACT.

D. Acceptance Testing: Contact SCO to request acceptance testing by SNL Fire Alarm Maintenance personnel after commissioning the fire alarm system. Complete and deliver the “Fire Protection Systems – Request for Acceptance Testing” form (Attachment 7) and the “Fire Alarm System - Quality Assurance Checklist” form (Attachments 8) to the SCO.

E. Equipment Removal: Remove existing disconnected fire alarm equipment and restore damaged surfaces. Package and deliver unused functional fire alarm equipment to the SNL Fire Alarm Maintenance Supervisor.

F. Coordination with Frame and Dry Wall Installation

1. Install FACP enclosure back box semi-flush inside wall and conceal conduits to FACP in wall prior to completing dry wall installation. Coordinate framing with the installation of the FACP back box.

2. Flush-mount back boxes and J-boxes for annunciators, manual pull stations and notification appliances prior to completing dry wall installation.

G. Coordination with Sprinkler System Installation

1. Sprinkler water flow switches and valve tamper switches are installed by the sprinkler Contractor. Addressable modules will be provided by the fire alarm installer to connect these switches to the SLC.

2. Install raceways and wiring to sprinkler system devices connected to the fire alarm system only after the alarm devices have been installed by the sprinkler contractor.

PART 2 -PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following manufacturers:

1. FACP:
   a. Edwards Systems Technology, Inc. (EST)
   b. NOTIFIER
2. Initiation Devices and Addressable Modules:
   a. Edwards Systems Technology, Inc. (EST)
   b. NOTIFIER
3. Notification Appliances and Power Supplies:
   a. Wheelock
   b. System Sensor
4. Continuous Linear Heat-Detector System:
   a. Protectowire.
5. Voice Evacuation System:
   a. NOTIFIER
6. Miscellaneous FACP Components:

a. Phoenix Contact

2.02 EXISTING FIRE ALARM SYSTEM

A. Compatibility with Existing Equipment: When modifying an existing building fire alarm system, the new components shall operate as an extension of the existing fire alarm system.

2.03 FIRE ALARM CONTROL PANEL

A. Description: Provide an intelligent fire alarm control panel with the internal components required for a fully operational fire alarm detection and evacuation system meeting the requirements of NFPA 72.

B. Manufacturer/Model Number:

1. Edwards Systems Technology, Inc. (EST), QuickStart Model QS4-12-G-1

2. NOTIFIER, Model NFS-640, with SBB-B4 and DR-B4 backbox/door assembly.

a. PD-NCA 640-character display

b. PD-2 80-character display

C. Transmission to Central Station: Provide a Digital Alarm Communicator Transmitter (DACT) inside FACP utilizing Ademco Contact ID communication format to automatically transmit alarm, trouble, and supervisory signals to the SNL Central Station.

D. Primary Power: 24 VDC obtained from 120 VAC service and a power-supply module. Initiating devices and DACT shall be powered by the 24 VDC source.

1. The alarm current draw of the entire fire alarm system shall not exceed 80 percent of the power-supply module rating.

2. Power supply shall have a dedicated 20-amp branch circuit breaker from the nearest power panel.

E. Secondary Power: 24 VDC supply system with batteries and automatic battery charger and an automatic transfer switch.

1. Batteries: Sealed, valve-regulated, recombinant lead acid.

2. Battery and Charger Capacity: Comply with NFPA 72. The batteries shall be sized to operate the system under the maximum normal load for 24 hours and then be capable of operating the system for 5 minutes in the alarm condition.

F. Surge Protection: Install surge protectors recommended by FACP manufacturer. Install surge protection devices on all system wiring external to the building housing the FACP and internal to the FACP as required for the protection of electronic components.

G. Auxiliary FACP Enclosure Manufacturer/Model Number:

1. NOTIFIER FACPs: NOTIFIER, Model SBB-A4 and DR-A4B black backbox/door assembly with no window.

2. EST QuickStart FACPs: Hoffman Telephone Cabinet, 18" x 18" x 4", Cat. # ATC18184S (surface mount) or ATC1884F (flush mount).

H. Voice Evacuation System: Voice evacuation system components shall be an integral part of and U.L. listed for use with the NOTIFIER NFS-640 FACP.

I. Miscellaneous FACP Components: Refer to Attachment 5 "EST QuickStart FACP Modification Details" and Attachment 6 "NOTIFIER NFS-640 FACP Modification Details" for specifications for Phoenix Contact circuit breakers, outlets, DIN rails, and switches.

2.04 MANUAL FIRE ALARM PULL STATIONS

A. Manufacturer/Model Number:

1. EST, Model SIGA-278, double action fire alarm station.

2. NOTIFIER, Model NBG-12LX, dual-action addressable pull station.

B. Surface Mounting Boxes: If surface mounting of pull station is required, provide the following box:

1. EST, Model 276B-RSB, red surface mount box for SIGA-278 series pull station.

2. NOTIFIER, Model SB-10, surface back box for NBG-12LX pull station.

2.05 SMOKE DETECTORS

A. Photoelectric Smoke Detectors:

1. Manufacturer/Model Number:

a. EST, Model SIGA-PS, mounted on standard detector base SIGA-SB4.

b. NOTIFIER, Model FSP-851, mounted on standard detector base B710LP.

2. Detector Isolator Bases: Where required on drawings, provide the following detector isolator base:

a. EST, Model SIGA-IB4.

b. NOTIFIER, Model B224BI.

B. Duct Smoke Detectors:

1. Manufacturer/Model Number:

a. EST, Model SIGA-DH duct smoke detector housing with a Model SIGA-PS photoelectric smoke detector.

b. NOTIFIER, Model FSD-751P.

2. Weatherproof Duct Housing Enclosure: UL listed for use with the supplied detector for use in exterior locations or a NEMA 3R enclosure sized to contain the detector.

3. Remote Test Station: NOTIFIER, Model RTS451KEY with key reset switch.

4. Remote LED Annunciator:
   a. EST, Model SIGA-LED remote alarm LED.
   b. NOTIFIER, RA400Z.
5. Sampling Tubes: Design and dimensions as recommended by manufacturer for the specific duct size, air velocity, and installation conditions where applied.

2.06 HEAT DETECTORS

A. Heat Detector, Combination Type: Actuated by either a fixed temperature of 135ºF or rate-of-rise of temperature that exceeds 15ºF per minute, unless otherwise indicated.
   1. EST, Model SIGA-HRS, mounted on standard detector base SIGA-SB4.
   2. NOTIFIER, Model FST-851R, mounted on standard detector base B710LP.

B. Heat Detector, 135ºF Fixed-Temperature Type: Actuated by temperature that exceeds a fixed temperature of 135ºF, unless otherwise indicated.
   1. EST, Model SIGA-HFS, mounted on standard detector base SIGA-SB4.
   2. NOTIFIER, Model FST-851, mounted on standard detector base B710LP.

C. Heat Detector, High Temperature Fixed-Temperature Type: Actuated by temperature that exceeds a high fixed temperature as indicated.
   1. NOTIFIER, Model FST-851H, 190ºF, mounted on standard detector base B710LP.

D. Continuous Linear Heat-Detector System: Consists of detector cable and control unit manufactured by Protectowire.
   1. Detector Cable: Rated detection temperature 155ºF, unless otherwise indicated. Listed for "regular" service and a standard environment. Cable includes two steel actuator wires twisted together with spring pressure, wrapped with protective tape, and finished with PVC outer sheath. Each actuator wire is insulated with heat-sensitive material that reacts with heat to allow the cable twist pressure to short circuit wires at the location of elevated temperature.
   2. Addressable Module: Provide FACP manufacturers standard addressable module to communicate detector status (normal, alarm, or trouble) to the FACP.

2.07 CONVENTIONAL INITIATION DEVICES

A. Flame Detector: Provide the FACP manufactures recommended UV/IR detector, or as indicated on drawings.

B. Manual Pull Station: EST Model 278B-1320 double action, key reset, double pole.

C. Smoke Detector: EST Model 2M-PD.

D. Heat Detector:
   1. Fixed Temperature 135F / rate-of-rise 15F: EST Model 281B-PL.

2. Fixed Temperature 194F / rate-of-rise 15F: EST Model 282B-PL.

3. Fixed Temperature 194F: EST Model 284B-PL.

2.08 NOTIFICATION APPLIANCES

A. Multitone Horn:

1. Wheelock MT-12/24 multitone horn, 24 VDC.

B. Multitone Horn Strobe:

1. Wheelock MT-241575W-FR multitone strobe, 24 VDC, 15/75 candela.

C. Strobe:

1. Wheelock RSS-241575W-FR strobe, 24 VDC, 15/75 candela, wall mount.

2. Wheelock RSS-24MCW-FR multi-candela strobe, 24 VDC, wall mount.

3. System Sensor SpectrAlert, Model S1224MCK, multi-candela strobe, 24 VDC, weatherproof and outdoor-listed.

D. Surface Mounting Boxes: If surface mounting of NAC appliances is required, provide the following box:

1. Wheelock SHBB surface mount back box for Wheelock RSS series strobes.

2. Wheelock IOB-R surface mount back box for Wheelock MT series multitone appliances.

E. Synchronizing Module:

1. Wheelock SM-24-R.

2. Wheelock DSM-24-R.

F. Speaker/Strobes: Speaker notification appliances shall be System Sensor SpectrAlert SP2 series wall speaker/strobe appliances.

2.09 NOTIFICATION APPLIANCE POWER SUPPLY PANELS

A. NAC Power Supply: Wheelock PowerPath PS-12/24-8MP power limited 8-ampere power supply/charger with batteries to provide a secondary backup power supply.

B. Batteries: Power-Sonic PS-12120 (or equal) 12 VDC, 7AH sealed lead-acid batteries (two required).

2.10 ALARM TERMINAL CABINET

A. Fire Alarm Terminal Cabinet: Hoffman Telephone Cabinet, 18” x 18” x 4”, Cat. # ATC18184S (surface mount) or ATC1884F (flush mount).

2.11 MAGNETIC DOOR HOLDERS

A. Description: Units are equipped for wall or floor mounting as indicated and are complete with matching door plate.

1. Electromagnet: Requires no more than 3 W to develop 25-lbf (111-N) holding force.
2. Wall-Mounted Units: Flush mounted, unless otherwise indicated.
3. Rating: 120 VAC.

B. Material and Finish: Match door hardware.

2.12 REMOTE ANNUNCIATOR

A. Description: Duplicate annunciator functions of the FACP for alarm, supervisory, and trouble indications. Also duplicate manual switching functions of the FACP, including acknowledging, silencing, resetting, and testing.

B. Manufacturer/Model Number:

1. EST, Model QS4-CPU-1.
2. NOTIFIER, Model LCD-80TM, 80 character terminal mode.

C. Flush-Mounted Boxes: If flush mounting of annunciator is required, provide the following box:

1. EST, Model QSA-1-F, flush remote annunciator cabinet with space for one SL30 display.
2. NOTIFIER, Model ABF-1D, semi-flush mount backbox for one LCD-80TM annunciator.

D. Surface-Mounting Boxes: If surface mounting of annunciator is required, provide the following box:

1. EST, Model QSA-1-S, surface remote annunciator cabinet with space for one SL30 display.
2. NOTIFIER, Model ABS-1T, deep surface-mount box for one LCD-80TM annunciator.

2.13 ADDRESSABLE MODULES

A. Description: Addressable modules shall be compatible and UL-listed for use with the FACP.

B. Monitor Modules: Provide addressable modules to connect supervised IDC zones of conventional alarm initiating devices (any N.O. dry contact device) to a FACP Signal Line Circuit.

C. Control and Relay Modules: Capable of providing a direct signal to operate fire alarm system equipment and other building system components during an alarm signal as indicated on the fire alarm system input/output matrix for fire alarm system operation.

D. Isolator Modules: Isolator modules compatible with the FACP provided where indicated on the drawings.

2.14 DIGITAL ALARM COMMUNICATOR TRANSMITTER

A. Functional Performance: The DACT shall be an integral part of the FACP that receives an alarm, supervisory, or trouble signal from the FACP, and automatically captures one or two telephone lines and dials a preset number Sandia's Central Station DACR(s). When contact is made with the DACR(s), the signal is transmitted using the Ademco Contact ID communication format. The DACT shall support independent zone/point reporting when used in the Contact ID format. The unit supervises two telephone lines. If service on either line is interrupted, the unit initiates a local trouble signal and transmits a signal indicating loss of telephone line to the Central Station over the remaining line. When telephone service is restored, unit automatically reports that event to the Central Station. If service is lost on both telephone lines, the local trouble signal is initiated.

B. Primary/Secondary Power: The FACP will provide primary and secondary power for the DACT.

C. Self-Test: Conducted automatically every 24 hours with report transmitted to Sandia Central Station.

2.15 WIRE AND CABLE

A. Wire and cable for fire alarm systems shall be UL listed and labeled as complying with NFPA 70, Article 760.

B Signaling Line Circuits:

1. Non-Plenum Cable: SLC cables installed in conduit from FACP to and between addressable devices/modules shall be 2 twisted #16 AWG solid copper, unshielded, NEC Type FPLR, conductors color-coded red and black, blue jacket, West Penn #990 or equivalent. Use #14 AWG SLC cable where required due to length of circuit.

2. Plenum Cable: SLC cables installed above ceiling without conduit from FACP to and between addressable devices/modules shall be 2 twisted #16 AWG solid copper, unshielded, NEC Type FPLP, conductors color-coded red and black, West Penn #60991B or equivalent.

C. Initiation Device Circuits:

1. IDC wiring from addressable modules to conventional zones and conventional initiation devices shall be 2 twisted #14 AWG solid copper, unshielded, NEC Type FPLR, conductors color-coded red and black, red jacket, West Penn #994 or equivalent.

2. IDC wiring installed in underground raceways shall be 2 twisted #14 AWG solid copper, unshielded, NEC Type FPL, conductors color-coded red and black, black jacket, West Penn #AQ226 or equivalent.

D. Notification Appliance Circuits:

1. Non-Plenum Cable: NAC cables installed in conduit shall be 2 twisted #14 AWG solid copper, unshielded, NEC Type FPLR, conductors color-coded red and black, red jacket, West Penn #994 or equivalent.

2. Plenum Cable: NAC cables installed above ceiling without conduit shall be 2 twisted #14 AWG solid copper, unshielded, NEC Type FPLP, conductors color-coded red and black, West Penn #60993B or equivalent.

E. DACT Telephone Circuit: 8-conductor CAT5 telephone cable. Cable installed above ceiling without conduit shall be plenum-rated.

F. Control Circuits: Control circuits shall be #12 AWG THWN solid copper, color-coded red and black.

G. AC Power Circuits: 120 VAC circuits shall be #12 AWG THWN solid copper.

1. Prefabricated Buildings: Type AC (BX) cable, with ground wire.

H. Annunciator Circuits: Wiring from FACP to annunciator panels shall be the FACP manufacturers recommended cabling.

I. FACP Network Circuits: Wiring between multiple networked FACPs shall be the FACP manufacturers recommended cabling.

J. Cable Fasteners: B-Line #BX6 flexible conduit/cable to stud fastener.

PART 3 -EXECUTION

3.01 GENERAL REQUIREMENTS

A. The Fire Alarm System Installer shall:

1. Furnish and install all fire alarm equipment and FACP components.

2. Install SLC, IDC, and NAC cables or assign task to the Electrical Contractor.

3. Perform all programming, tests, and commissioning required for a fully functional fire alarm system.

4. Label all fire alarm panels, NAC power supplies, initiating devices, modules, and NAC appliances.

5. Demonstrate, in the presence of SNL maintenance and the SCO, that each input device/module operates and activates the output NACs and fire safety function systems per the design basis of the fire alarm system.

B. The Electrical Contractor shall furnish and install the following:

1. All required raceways, j-boxes, initiating and notification device mounting boxes, and all associated hardware per the requirements on the shop drawings. Refer to Section 16001 “Electrical Work” for further requirements for raceway installations.

2. Install and terminate 120 VAC circuits.

3. Mount the fire alarm control panel, auxiliary FACP, NAC power supplies, and fire alarm terminal cabinets.

C. Mount initiation devices and notification appliances at the elevations and locations specified in NFPA 72 and the manufacturers' specifications. Initiating devices shall be located where they are accessible for maintenance and testing.

D. Connecting to Existing Equipment: Verify that existing fire alarm system is operational before making changes or connections.

1. Expand, modify, and supplement the existing detection, notification, and control fire alarm system components as necessary to extend the existing control and monitoring functions to the new fire alarm equipment being installed.

2. New fire alarm equipment components shall be capable of merging with the existing fire alarm system configuration without degrading the performance of either system.

E. Firestopping: Firestopping shall be provided where conduit penetrates rated firewalls and all floors per the requirements in Section 07270.

3.02 EQUIPMENT INSTALLATION

A. Fire Alarm Control Panel (FACP):

1. Primary power, 120 VAC, for the panel shall be from a 20 amp dedicated branch circuit at the nearest power panel. The electrical breaker of the branch circuit shall be identified by a red painted dot adjacent to each breaker.

2. Install ½" EMT from the FACP to the IDR room with telephone premises cable for DACT communication to the Sandia Central Station. The DACT communications cable can be routed in SLC raceway.

3. Location: Mount the FACP at a location near the building entrance, or where indicated on drawings, that is readily visible to emergency responders.

4. Mounting Height: Semi-flush mount FACP, unless indicated otherwise on drawings, with top of cabinet not more than 72 inches above the finished floor. Surface-mount FACP on masonry and brick surfaces.

5. Install a pull box or wireway in the ceiling above the FACP in a concealed accessible location to minimize conduit penetrations into the FACP enclosure. Refer to Standard Drawing FA5003STD for details.

6. Install NAC synchronizing modules, surge protection, and other serviceable equipment in an auxiliary FACP enclosure located above the FACP. Do not install serviceable equipment above the ceiling.

7. Install NOTIFIER PD-NCA display in NOTIFIER NFS-640 FACP for buildings greater than 40,000 ft^2 or the main FACP in a networked system. Install a PD-2 display in buildings less than 40,000 ft^2.

8. Fire Safety Function/NAC Disable Switch: Install a supervised N.O. switch in the FACP to allow maintenance personnel to service and test FACP with out

impacting building occupants and building control systems. Program the FACP such that upon closing the switch, all NACs and fire safety functions (HVAC and elevator controls) will be disabled

B. Manual Fire Alarm Pull Stations:

1. Install pull station semiflush in recessed back box unless otherwise indicated.
2. Mount manual pull station 4'-0" above finished floor in highly visible accessible locations on exit egress routes. Install pull station on the latch side of egress door within 5 feet of the door.

C. Smoke Detectors:

1. Ceiling-Mounted Smoke Detectors:
   a. Install not less than 4 inches from a sidewall to the near edge.
   b. For exposed solid-joist and solid beam construction exceeding 12 inches in depth, install detectors inside each beam pocket.
   c. For open-joist construction exceeding 12 inches in depth, mount detectors on the ceiling. For open-joists 12 inches or less in depth, mount detectors on the bottom of the joists.
   d. Smooth ceiling spacing shall not exceed the rating of the detector.
2. Wall-Mounted Smoke Detectors: Install at least 4 inches, but not more than 12 inches, below ceiling.
3. Location Restrictions: No smoke detector shall be located closer than 3 feet to any air register or diffuser.
4. Do not install smoke detectors until after cleanup of all construction trades is complete and final. Do not remove dust covers provided with detector until the time of the final acceptance testing of the fire alarm system.

D. Heat Detectors:

1. Spacing of heat detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas, shall be determined per NFPA 72 requirements.
2. Install not less than 4 inches from a side wall to the near edge. For exposed solid-joist construction, mount detectors on the bottom of joists. Smooth ceiling spacing shall not exceed the rating of the detector or the manufacturers specifications.
3. Heat Detectors in Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location.
4. Location Restrictions:
   a. Install heat detectors no closer than 18 inches to any air register or diffuser
   b. Install heat detectors no closer than 3 feet to any part of any heat generating device in mechanical rooms such as flues, boilers, water heaters, etc.

c. Install heat detectors no closer than 12 inches to any part of any light fixture.

E. Duct Smoke Detectors:

1. Locate and install duct detector in compliance with NFPA 72 and NFPA 90A requirements. Install sampling tubes so they extend the full width of the duct with sampling holes facing into the air flow. Do not install duct detector on top of duct.

2. Install duct detector, duct housing and sampling tube in strict conformance with the manufacturer's installation instructions.

3. Install duct detector housing in duct where it can be accessed for maintenance of smoke detector. When a ladder cannot be used to access duct detector from finished floor, provide access door or platform where a maintenance worker can reach the duct detector. The platform shall support a minimum of 300 pounds.

4. Provide a weatherproof enclosure to contain duct detectors installed in outdoor locations (unless the detector is rated for exterior installation).

F. Remote Test Station: Install Remote Test Station (RTS) for each NOTIFIER duct smoke detector and conventional duct smoke detector. Locate and group the RTSs in the nearest equipment room or electrical closet with a label on each RTS indicating the duct smoke detector it activates.

G. Remote Alarm LED: Install a Remote Alarm LED at the following locations:

1. On the ceiling below each duct detector concealed above a ceiling.

2. On the outside of each EST Duct Smoke Detector Housing.

H. Addressable Modules:

1. Install addressable modules as required to monitor each detection devices with N.O. and N.C. contacts for connection to the SLC.

2. Do not install the SLC outside of the building housing the FACP unless approved by the SNL FPE. For detection devices exterior to the building (e.g., PIV tamper switches, detection devices in sheds) or IDCs in small connected buildings (<= 4 conventional zones), install addressable modules inside the building housing the FACP to connect the exterior devices and zones.

3. Install addressable modules as required to control ancillary equipment controlled by the FACP and to activate the NAC power supplies.

4. Do not install addressable modules above the ceiling or inaccessible locations.

I. Isolator Modules: Install isolator modules on SLC every 20-25 detector/modules or when the SLC enters a new floor or section in the building.

J. Notification Appliances:

1. Locations: Install multitone horn appliances at locations to comply with NFPA 72 requirements for audible levels. Install strobes in common areas (e.g., restrooms, conference rooms, hallways), and open areas with 10 or more occupants. Install weatherproof strobe on the exterior of the building at the main entrance(s) readily visible to emergency responders.

2. Mounting Heights: Surface-mount notification appliances on the wall between 80 and 96 inches above finished floor, and not less than of 6 inches below the ceiling. In computer rooms, high/low bays, and labs, install notification appliance at maximum height of 96 inches to prevent blockage by cabinets and equipment.

3. Settings: Set multitone horn dipswitches for the bell tone and the decibel level at "STANDARD" setting (SW1=0) in office and assembly areas; and in stairwells. Set decibel setting at "HI" (SW1=1) in all other locations. Factory default setting is at HIGH dBA Horn Tone.

Multitone Horn Settings	SW1	SW2	SW3	SW4
High dBA - Bell Tone	1	1	0	1
Standard dBA - Bell Tone	0	1	0	1

4. Replace factory installed 18 AWG jumpers on Wheelock horn/strobe appliances with #14 AWG jumpers with same insulation color code (red, black) to match the factory wiring.

K. NAC Power Supply:

1. Mounting Height: Surface mount with top of power supply not more than 72 inches above the finished floor.

2. Settings:

   a. 24 VDC output.

   b. Steady output.

   c. IN>OUT SYNC Mode, or WHEELOCK SYNC Mode.

3. Power Switch: Install a toggle switch inside the power supply where the 120 VAC enters panel to allow the incoming AC power to be disconnected.

L. FATC: Surface mount, with top of enclosure not more than 72 inches above the finished floor.

M. Annunciator:

1. Install annunciator semiflush in recessed back box unless otherwise indicated.

2. Mounting: Install with top of annunciator not more than 60 inches above the finished floor.

3.03 CONDUIT AND RACEWAYS

A. Conduit and raceways shall be installed in accordance with the National Electric Code (NEC) and Division 16, Section 16001 “Electrical Work”.

B. Fire alarm conduit shall be sized as follows: ½” for 1 to 2 fire alarm cables and 120 VAC circuits; and ¾” for 3 or more fire alarm cables (unless noted otherwise on plans or per the NEC requirements for cable fill in raceways).

C. Conduits shall not enter the FACP, or any other remotely mounted annunciator or NAC power supply, except where permitted by the equipment manufacturer.

D. Conduits used for fire alarm circuits, and equipment control wiring associated with the fire alarm system, may not contain any other wire or cable.

E. Paint fire alarm system junction box covers red.

F. Seal conduit exiting the building to prevent moisture from entering the building due to the weather or condensation.

G. SLC Conduits: Conduits for the Signaling Line Circuit (SLC) cables shall be installed as a Class A circuit such that the outgoing and return conductors, exiting from and returning to the fire alarm control panel, are routed in separate raceways. The minimum separation of raceways is 1 foot where the raceway is installed vertically and 4 feet where the raceway is installed horizontally. The outgoing and return cables shall be permitted to be run in the same raceway under any of the following conditions.

1. For a distance not to exceed 10 feet where the outgoing and return conductors enter or exit the initiating device or fire alarm control panel.
2. A single conduit drops to an individual alarm-initiating device.
3. A single conduit drops to multiple devices installed within a single room not exceeding 1000 ft^2 in area.

3.04 WIRING INSTALLATION

A. Wiring Method:

1. Install wiring in metal raceway according to Division 16 Section 16001 "Electrical Work."
2. Fire alarm circuits and equipment control wiring associated with the fire alarm system shall be installed in a dedicated raceway system. This system shall not be used for any other wire or cable.
3. Terminations: All field wiring shall terminate on terminal blocks in FACP, fire alarm terminal cabinets, and at field devices and appliances. Splices are not permitted in field wiring except as specifically allowed. Connections using wire nuts are not permitted.

4. Signaling Line Circuits: SLC and IDC conductors shall not be smaller than 16 AWG. Power-limited fire alarm cables may be installed in the same cable or raceway as signaling line circuits.

5. Notification Appliance Circuits: NAC conductors shall not be smaller than 14 AWG.

B. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with minimal excess. For NAC cables, peel the jacket back 8 inches from the termination point to permit taking load readings. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

C. Cable Taps: Cable taps (T-taps) are not permitted on the SLC and NAC circuits.

D. Color-Coding:

1. Signaling Line Circuit (SLC): Red (+), Black (-), Blue jacketed cable

2. Initiating Device Circuit (IDC): Red (+), Black (-), Red jacketed cable

3. Notification Appliance Circuit (NAC): Red (+), Black (-), Red jacketed cable

4. Control Circuit: Red (+), Black (-)

5. 120 VAC: Hot (Phase A – Black, Phase B – Red, Phase C – Blue), Neutral – White, and Ground – Green.

E. For Class A circuits provide separate conduits for outgoing and return cables per the requirements in NFPA 72.

F. Notification Appliances:

1. Synchronize strobes per the requirements in NFPA 72 and the manufacturers requirements.

2. Do not exceed 80% of the permissible NAC amperage load during initial installation to allow future appliance additions to the NAC.

3.05 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals according to Division 16, Section 16001, “Electrical Work."

B. Identify dedicated fire alarm circuit breakers with a red paint dot and label "FA".

C. Install nameplates on outside door of Fire Alarm Terminal Cabinets and Notification Appliance Power Supply Panels in accordance with Standard Drawing E-0006STD.

D. EST Quickstart SLC Cable: At each termination point, label the SLC cable jacket “IN” and “OUT” to identify the SLC wiring data inputs/outputs.

E. IDC Cable: For conventional fire alarm systems, at each termination point label the card and point number on the cable jacket (e.g., 1-02).

F. NAC Cable: At each termination point, label the NAC circuit number on the cable jacket (e.g., NAC1, PS1-NAC2).

G. Initiating/NAC Devices:

1. Label the module/detector address (e.g., M126, D002) on each device, including water flow detection and tamper switches. For conventional fire alarm systems, label the card/point number on each device.

2. Identify heat detectors with Arial font, minimum size 18 label marked "HEAT" to distinguish detector from a smoke detector.

3. Labels shall be Arial font, minimum size 18, black letters on a white background.

4. For each device, place label(s) on a smooth surface in a location readily visible to identify the device.

5. Locate labels on NAC appliances on bottom left lip of appliance on smooth surface.

6. Label the last notification appliance on each NAC that has an end-of-line resistor with a label marked "EOLR".

H. Paint J-box and pull box covers red to identify as fire alarm equipment. Label the covers of enclosures containing exposed 120 VAC terminations "120 VAC INSIDE".

I. Conduit Labeling

1. Brown ¾" tape (Scotch #351) at each joint and termination for conduits containing initiating and notification circuits.

2. Install white ¾" tape (Scotch #351) adjacent to brown tape to identify communication conduit from DGP to IDR.

3. Install blue ¾" tape (Scotch #351) adjacent to brown tape for conduits containing fire alarm control circuits.

3.06 GROUNDING

A. Ground the FACP and associated circuits; comply with IEEE 1100. Provide grounding for the FACP and NAC power supplies as required by NFPA 70 and the manufacturer's recommendations.

3.07 PREFABRICATED OFFICE UNITS INSTALLATION

A. Fire Alarm Control Panel

1. Location: Install the FACP at the main entrance to the office units
2. AC Power: Provide a dedicated 120 VAC, 20-amp branch circuit from the nearest power panel for FACP power. Use BX cable for the circuit wiring.
3. Telecommunications: Provide a plenum-rated CAT5 telephone cable (8-conductor) from the FACP to the IDR for the DACT primary and secondary phone numbers.
4. Provide 120 VAC Surge Protection, circuit breaker, and utility outlet; and 24 VDC battery and NAC circuit disconnect switches in the fire alarm control panel per the details in Attachment 5 “EST QuickStart FACP Modification Details” and Attachment 6 “NOTIFIER NFS-640 FACP Modification Details”.

B. Manual Pull Stations: Install pull stations on surface-mounted back boxes 4'-0" above finished floor in highly visible locations on exit egress routes. Install pull station on the latch side of egress door immediately adjacent to the door.

C. Photoelectric Smoke Detectors: Install smoke detectors to provide complete coverage protection in the office complex units when there is no automatic sprinkler system installed. Install smoke detectors in locations and at the spacing listed in NFPA 72 and per the manufacturers recommendations. If a sprinkler system is installed throughout the office complex units, install smoke detectors only in the IDR and in the immediate vicinity of the FACP.

D. Heat Detectors: Install heat detectors in rest rooms and other locations where the installation of smoke detectors is inappropriate due to the potential for nuisance alarms. Install heat detectors at the spacing listed in NFPA 72 and per the manufacturers recommendations. If a sprinkler system is installed throughout the office units, do not install heat detectors.

E. Automatic Sprinkler System Initiating Devices: Provide individual monitor modules for each water flow, pressure switch, or tamper supervisory switch installed on the automatic sprinkler protection system. Coordinate location of monitor modules with the contractor installing the automatic sprinkler system.

F. Notification Appliances

1. Multitone Horns: Provide audible notification appliances throughout the building as required to achieve the decibel levels required by NFPA 72.
2. Strobes: Provide visual notification appliances in all common areas (e.g., restrooms, conference rooms, break areas, corridors, hallways, and open areas with calculated occupant loads of 10 or more occupants.
3. Emergency Responder Appliance: At the main entrance(s) to the building, provide a weatherproof outdoor-listed strobe on the exterior wall of the building that is readily visible to emergency responders for indicating when the building fire alarm system is in an ALARM condition.

G. Raceway and Wiring

1. Install 1" EMT from the FACP to 4" above the drop-in ceiling for installation of the SLC, and NAC, and telephone plenum-rated cables into the ceiling space.

2. Install 1" EMT from the FACP to 4" above the drop-in ceiling for installation of Type AC (BX) cabling to the power panel and the FACP grounding conductor.

3. Securely install mounting boxes for the mounting of pull stations, smoke detectors, heat detectors, multitone horns, and strobes. Install surface-mounted ½" EMT below the ceiling to protect the plenum-rated wiring to the manual pull stations and audio/visual appliances. Paint the raceway to match the wall-mounting surface.

3.08 PROGRAMMING

A. Program each signal input to report to the Central Station using Contact ID.

B. Program a 6-hour time delay for AC power loss alarm transmittal to the Central Station to prevent excessive alarm signal transmittals during a global power outage. Upon restoral of AC power, the FACP AC power loss alarm shall automatically reset.

C. Fire Safety Function/NAC Disable Switch: Program the FACP fire safety function/NAC disable switch such that upon closing the switch, all NACs and fire safety functions (HVAC and elevator controls) will be disabled to allow maintenance personnel to service and test FACP with out impacting building occupants and building control systems.

D. Refer to Attachment 3 "EST QuickStart Configuration Utility Programming Guidelines" and Attachment 4 "NOTIFIER NFS-640 Programming Guidelines" for instructions for DACT programming and maintaining programming consistency for the SNL site fire alarm control panels.

3.09 FIELD QUALITY CONTROL

A. Pre-Acceptance Test: The Fire Alarm System Installer shall perform the following field tests and inspections prior to Acceptance Testing:

1. Perform each electrical test and visual and mechanical inspection listed in NFPA 72. Certify compliance with test parameters.

2. Visual Inspection: Conduct a visual inspection before any testing. Use as-built drawings and system documentation for the inspection. Identify improperly located, damaged, or nonfunctional equipment, and correct before beginning tests.

3. Testing: Follow procedure and record results complying with requirements in NFPA 72.

a. Detectors that are outside their marked sensitivity range shall be replaced.

4. Complete "Fire Protection Systems – Request for Acceptance Testing" form (Attachment 7).

5. Complete “Fire Alarm System - Quality Assurance Checklist” form (Attachment 8).

6. NAC Decibel Level Test: Perform sound tests to determine decibel levels in all areas of the building with all NAC appliances operating on primary power. Note decibel levels on floor plans and deliver to SNL FPE prior to system acceptance test. Install additional NAC appliances in areas with deficient decibel levels. Refer to Part 1.07G in this Section for the minimum levels required for each Occupancy.

B. Acceptance Testing

1. The fire alarm installer shall demonstrate, in the presence of SNL maintenance and the SCO, that each input device/module operates and activates the output NACs and fire safety function systems per the design basis of the fire alarm system.

2. Complete the Record of Completion shown in NFPA 72 and get approval signature from the AHJ.

3.10 CLEANING

A. Cleaning: Remove paint splatters and other spots, dirt, and debris from fire alarm equipment. Touch up scratches and marred finishes to match original finish.

B. Clean the interior of FACP and other fire alarm system enclosures.

3.11 WARRANTY

A. All equipment, materials and installation shall be warranted by the Contractor/Manufacturer during construction and for a period of one year after the final acceptance testing of the fire alarm system installation as recorded on the Record of Completion.

PART 4 -ATTACHMENTS

4.01 Attachment 1 – FACP Installation Details

4.02 Attachment 2 – Fire Alarm Central Station – Contact ID Codes

4.03 Attachment 3 – EST QuickStart Configuration Utility Programming Guidelines

4.04 Attachment 4 – NOTIFIER NFS-640 Programming Guidelines

4.05 Attachment 5 – EST QuickStart FACP Modification Details

4.06 Attachment 6 – NOTIFIER NFS-640 FACP Modification Details

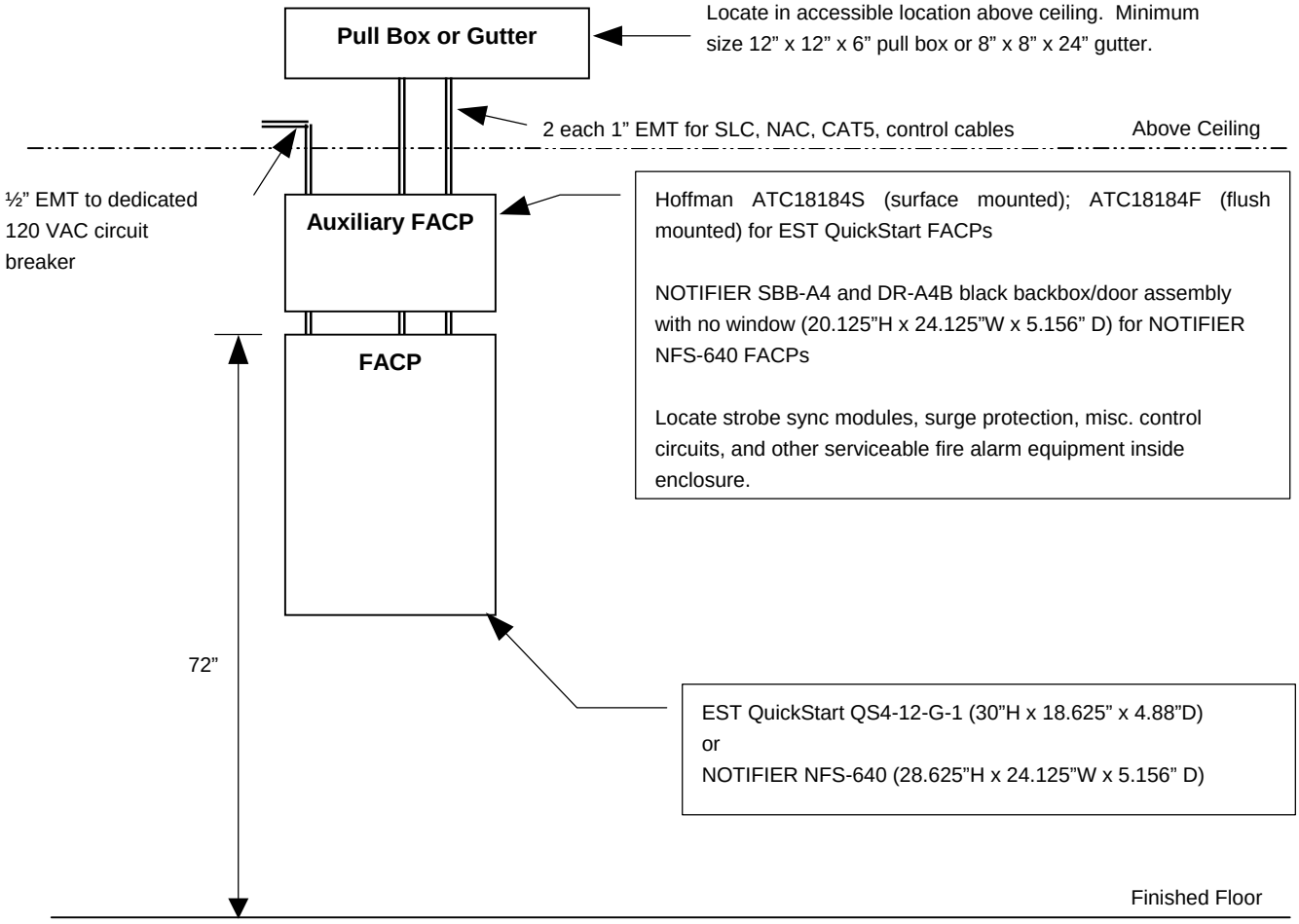
4.07 Attachment 7 – Fire Protection Systems – Request for Acceptance Testing

4.08 Attachment 8 – Fire Alarm System - Quality Assurance Checklist

4.09 Attachment 9 – Signage for Fire Alarm Impairment

END OF SECTION 13852

FACP INSTALLATION DETAILS



FIRE ALARM CENTRAL STATION – CONTACT ID CODES

Contact ID Event Code					
New Event	**Restoral**	**Signal Description**	**Priority**	**Event Flag**	**Classifier ID**
1110	3110	Fire Alarm	1	Y	Fire
1111	3111	Smoke Detector	1	Y	Fire
1112	3112	Combustion	1	Y	Fire
1113	3113	Sprinkler Flow	1	Y	Fire
1114	3114	Heat Detector	1	Y	Fire
1115	3115	Fire Pull Station	1	Y	Fire
1116	3116	Duct Smoke Detector	2	Y	Supervisory
1117	3117	Flame Detector	1	Y	Fire
1151	3151	Toxic Gas Detector	1	Y	Fire
1154	3154	RPBFP Catastrophic Failure	2	Y	Supervisory
1161	3161	HVAC Shutdown	4	Y	Supervisory
1200	3200	Fire Supervisory	2	Y	Supervisory
1201	3201	Low Pressure	2	Y	Supervisory
1202	3202	Low CO2	2	Y	Supervisory
1203	3203	Valve Tamper	2	Y	Supervisory
1204	3204	Low Water Level	2	Y	Supervisory
1205	3205	Pump Activated	2	Y	Supervisory
1206	3206	Pump Failure	2	Y	Supervisory
1300	3300	System (Panel) Trouble	3	Y	Equipment
1301	3301	AC Loss	4	Y	Equipment
1302	3302	Low Battery	3	Y	Equipment
1309	3309	Battery Test Failure	3	Y	Equipment
1310	3310	Ground Fault	3	Y	Equipment
1321	3321	Bell 1 Trouble	3	Y	Equipment
1322	3322	Bell 2 Trouble	3	Y	Equipment
1323	3323	Alarm Relay Trouble	3	Y	Equipment
1324	3324	Trouble Relay Troubl	3	Y	Equipment
1325	3325	NAC 3 Trouble	3	Y	Equipment
1326	3326	NAC 4 Trouble	3	Y	Equipment
1351	3351	Telco 1 Trouble	3	N	Equipment
1352	3352	Telco 2 Trouble	3	N	Equipment
1373	3373	Fire Trouble	3	Y	Equipment
1380	3380	Sensor Trouble	3	Y	Equipment
1385	3385	HSSD	1	Y	Fire
1602	3602	Periodtest	997	N	Equipment
1608	3608	Periodtest w Trouble	3	N	Equipment

Event Flag: Y = Signal goes to Operator; N = Signal does not go to Operator

EST QuickStart Configuration Utility Programming Guidelines

PROJECT

At the **Project Configuration** screen in the EST QuickStart Configuration Utility programming, perform the following data entry operations.

Options

Facility Name:	BLDG #### (list all bldgs. connected to FACP)	Installation Company:	
Level 3 Password (4 digits):	3333	Phone Number:	
		Programmer:	

Operations

Market Place:	NFPA 72	Annunciator Baud Rate:	9600
Language:	English (US)	Annunciator Comm Class:	Class B
Alarm Silence:		Drill Activation Type:	Steady
☐	Audible Only	☒	Allow Waterflow Silence
☒	Audible and Visual	☐	Inhibit Zone Resound
Drill:		☐	Enable 2 Stage Operation
☐	Audible Only	☐	Inhibit Zone Resound
☒	Audible and Visual	☐	Enable Trouble Reminder

Timing

Automatic Alarm Signal Silence:	Disabled (60 minutes in unoccupied buildings)
Alarm Signal Silence / Reset Inhibit:	Disabled
AC Power Trouble Delay:	6 Hours
Panel Silence Resound Time:	Disabled

EST QuickStart Configuration Utility Programming Guidelines

At the **Cabinet Configuration Form** screen in the EST QuickStart Configuration Utility programming, perform the following data entry operations.

Cabinet Selection

Panel: 1 Type: Intelligent – 12 Slot

Configure - SLIC Card Type (Cards Tab)

Retrieving data from the loop controller

Retrieving data from the loop controller copies the actual device configuration data into the configuration utility. The configuration utility uses this information to develop the loop diagram shown on the Mapping tab.

Tip: You should always retrieve the data from the loop controller after you make any changes to the loop and have a "clean" map (no conflicts). Doing so provides an accurate record of the loop configuration.

1. Connect the serial port on the service computer to the RS232 connections on the control panel.
2. Power up the laptop computer.
3. Click Start > Programs > QuickStart > QuickStart.
4. Open the project.
5. Open the loop controller configuration form
6. Click Configure > Cabinet.
7. Select the SLIC card then click Configure.
8. On the Controller tab, click the Port down arrow, and then select the COM port used to connect to the control panel
9. Click Retrieve Signature Data.

Controller Tab

Wiring Style:	
☒	Class A
☐	Class B
Mapping:	
☒	Enabled
☐	Disabled
Outputs:	
Output 1 Device Type:	Audible
Output 2 Device Type:	Audible

Communications:	
Port:	COM1
Baud Rate:	38400

Detectors Tab

Quantity:	1		
Primary Sensitivity:	Normal	Alternate Sensitivity:	Normal
Primary Verification:	None	Alternate Verification:	None
Primary Prealarm:	None	Alternate Prealarm:	None

Modules Tab

Add devices as required or use AutoLearn and AutoLoop utilities to upload system configuration to database.

EST QuickStart Configuration Utility Programming Guidelines

MESSAGE TEXT FORMAT

Message Text 1: Detector/Module Address/ZA8-2 Card/Point (e.g., M126, D002, 02-03);
Building (if different from where FACP is located);
Room Number

Message Text 2: Room Descriptor or Location within Room (e.g., East Exit, Rm ### Hall);
Device Type (e.g., Smk Det, Pull)

Configure – ZA8-2 Card Type (CARDS Tab)

Typical guidelines for entering Device Types and Text Messages that appear in QuickStart LED display are shown below.

Address	Device Type	Text 1	Text 2
1	Water Flow	1-01 Sprinkler	Water Flow
2	Tamper	1-02 Mech Rm	Sprinkler Tamper
3	Pull	1-03 Room ###	(N, S, E, W) Exit Pull
4	Audible	1-04 NAC #1	South Wing
5	Smoke	1-05 Room ___	Hall Smoke
6	Alarm	1-06 Room ___	Pull/Heat Det
7	Supervisory	1-07 Mech Rm	AHU-# Duct Det
8	Audible	1-08 NAC #2	North Wing

Configure – ZR8 Card Type (CARDS Tab)

Configuration of a ZR8 card is not required.

EST QuickStart Configuration Utility Programming Guidelines

Configure - DLD Card Type

In the EST QuickStart Configuration Utility software on the laptop, enter the information in **bold** print below to configure the dialer to transmit General Alarm, General Supervisory, and General Trouble information to the Central Station.

For the Account, #### is the transmitter number (e.g., Building 887 = 0887 transmitter #). Once entered in Account Information, it will automatically be entered in the Default Information data entry points.

Test Time can be any time (test time will change frequently when fire alarm system becomes operational)

When connecting to an AES IntelliNet radio subscriber unit, enter 555 for the phone number.

Receiver 1:		☐ Enable Receiver 2	Receiver 2:
Primary Telephone Number:	**2849195**	Retry Count: **10**	Primary Telephone Number:
Secondary Telephone Number:	**2849647**		Secondary Telephone Number:

Account Information					
Receiver	Account	Format	Test Time	Normal Test String	Abnormal Test String
1	**####**	**Contact ID**	**12:##:00 PM**	**160200000**	**160800000**

Default Alarm Information		Default Supervisory Information		Default Trouble Information	
Account:	####	Account:	####	Account:	####
Activation String:	**111000000**	Activation String:	**120000000**	Activation String:	**130000000**
Restoration String:	**311000000**	Restoration String:	**320000000**	Restoration String:	**330000000**

CABINET CONFIGURATION FORM (Filters Tab)

Events Displayed on LCD		Events displayed on Printer	
☒	Alarm	☒	Alarm
☒	Supervisory	☒	Supervisory
☒	Trouble	☒	Trouble
☐	Monitor	☐	Monitor

EST QuickStart Configuration Utility Programming Guidelines
CORRELATIONS

At the **Correlation Configuration** screen in the EST QuickStart Configuration Utility programming, perform the following data entry operations. NOTE: Two screens, one on left and one on right, appear in the **Correlation Configuration** screen which are used to correlate data selected in both screens to perform selected functions (e.g., activate NACs, send data to Central Station).

Creating Output Groups

Setting up an Output Group

Click Output Groups tab in left Logic Group Selection screen. Select Add Output Group. Enter the following data:

Descriptor: Output Group249 or other number generated from QuickStart programming upload
Address: 1 or default
Text 1: Building ____
Test 2: General Alarm

Delete unused Output Groups

Add an instruction that controls an output circuit

1. Click Output Group in the Logic Group Selection screen to which outputs (NACs) will be linked.
2. Click Outputs from right Response Selection screen.
3. In the Object Selection Form screen, select all outputs to be correlated with the Output Group highlighted in the Logic Group Selection screen. Click OK after highlighting each output.
4. Verify that the Action is "Activate" for each output.
5. Click the Priority arrow then select a priority of "High" for each output.

Correlating Output Groups with Inputs

Method #1

1. Click Devices in the Logic Group Selection screen. In the Device Selection screen, select device to be linked to an Output Group that will activate NACs upon going into alarm.
2. Click Add Output Group in right Output Group Selection screen. Select appropriate Output Group and click OK.
3. Repeat for all remaining devices in the Device Selection screen.

Method #2

1. Click Output Group in the Logic Group Selection screen to which inputs (points/zones that activate NACs) will be linked.
2. Click Responses in right Response Selection screen. Select Devices Activating Output Group, then Add Device. From the pop-up list of devices, add all devices that upon going into alarm will activate the building notification appliances for the Output Group selected in the Logic Group Selection screen.

Setting up QuickStart panel for First Alarm, Evacuation, and Drill outputs

1. Click on Devices in the Logic Group Selection screen and check Show Pseudo Points checkbox.
2. For First Alarm output, select Panel '0', Card '0', Address '2', "First Alarm". At Output Group Selection screen, click on Add Output Group and make selection. Click OK.
3. For Evacuation output, select Panel '0', Card '0', Address '6', "Evacuation". At Output Group Selection screen, click on Add Output Group and make selection. Click OK.
4. For Drill output, select Panel '0', Card '0', Address '7', "Evacuation". At Output Group Selection screen, click on Add Output Group and make selection. Click OK.

EST QuickStart Configuration Utility Programming Guidelines

Listed below is the typical QuickStart programming for various outputs that activate NAC audio/visual appliances.

Panel		Address	Type	Message	NAC Priority	Response Type	Command	Description
0	0	2	Alarm	First Alarm	High	Active	Activate	
0	0	6	Alarm	Evacuation	High	Active	Activate	
0	0	7	Monitor	Drill	High	Active	Activate	
1	ZA8-2 #	#			High	Active	Activate	Enter building specific descriptor
1	SLIC #	#			High	Active	Activate	Enter building specific descriptor

Service Groups

Removing a Service Group

1. Click Service Groups tab in left Logic Group Selection screen.
2. Select Service Group to remove and click on Remove Service Group. Delete unused Service Groups

EST QuickStart Configuration Utility Programming Guidelines

CONTACT ID Programming for Alarm Inputs

1. Click on Devices tab on Logic Group Selection screen. Check Show Pseud. Points check box.
2. Select record in Device Selection list requiring Contact ID reporting to Central Station.
3. At the Output Group Selection screen click on Responses tab, which brings up a Response Selection screen.
4. Click on Dialer String tab. Enter Contact ID information requested on screen. In **Send on** data field, select "Activation Only". Refer to the data in the following tables for guidelines on what data to enter in the other data fields. Use arrows at right margin of the data entry form to adjust the sequence of events to be communicated to the Central Station. Click on Dialer String tab and repeat information with "Restoration Only" selected for the **Send on** data field.
5. Repeat for all remaining devices and points in the Device Selection list that will be sending signals to the Central Station.

Dialer String Instructions

In the Response Selection screen, the data entry fields requiring information are listed below.

Response Type	• Select Activate to send dialer string information when a device goes into alarm condition. • Select Trouble to send dialer string information when a device goes into trouble condition.
Account	Enter account (transmitter number) for panel.
Priority	• Select Life Safety to communicate a fire alarm or life-threatening emergency. • Select Property to communicate an off-normal condition with the fire suppression system or related equipment. • Select System Integrity to communicate an off-normal condition or wiring fault that compromises the integrity of the system.
Send on	Click the Send On arrow, then click when you want the dialer to send the character string. • Select Activation Only to send the string only when the input is activated. • Select Restoration Only to send the string only when the input is restored.

String — The dialer string provides information on what data to send to the Central Station and is characterized as follows:

Q XYZ GG CCC, where

Q — Event Qualifier; 1 = New Event, 3 = New Restore

XYZ — Contact ID Event Code

110 – Fire	200 – Fire Supervisory	300 – System Trouble
111 – Smoke	201 – Low Pressure	301 – AC Loss
112 – Combustion	203 – Valve Tamper	309 – Battery Test Failure
113 – Water Flow	161 – HVAC Shutdown	321 – NAC Circuit #1 Trouble
114 – Heat	154 – RPBFP Flow Switch	322 – NAC Circuit #2 Trouble
115 – Pull Station		326 – NAC Circuit #3 Trouble
116 – Duct Detector		327 – NAC Circuit #4 Trouble
117 – Flame		351 – Telco 1 Fault
151 – Toxic Gas		352 – Telco 2 Fault
385 – HSSD		354 – Failure to Communicate
		373 – Fire Trouble
		380 – Sensor Trouble

GG — Group or Partition number. Use 00 to indicate that no specific group or partition information applies (typical). When using more than one SLIC board, use 01 for SLIC #1 and 02 for SLIC #2

CCC — Zone number (for Event reports). Use 000 to indicate that no specific zone applies.

EST QuickStart Configuration Utility Programming Guidelines

Listed below is the typical Contact ID programming for various detection devices requiring reporting to the Central Station.

Panel	Card	Address	FACP LED Text	Priority	Response Type	String	Send on
1	1 – 4 (SLIC) 5 – 9 (ZA8-2)	Point/Zone ###	Pull/Smk/Heat on same zone (FIRE)	Life Safety	Active	111000### 311000###	Activation Only Restoration Only
				System Integrity	Trouble	138000### 338000###	Activation Only Restoration Only
1	1 – 4 (SLIC) 5 – 9 (ZA8-2)	Point/Zone ###	Pull Stations	Life Safety	Active	111500### 311500###	Activation Only Restoration Only
				System Integrity	Trouble	138000### 338000###	Activation Only Restoration Only
1	1 – 4 (SLIC) 5 – 9 (ZA8-2)	Point/Zone ###	Smoke Detectors	Life Safety	Active	111100### 311100###	Activation Only Restoration Only
				System Integrity	Trouble	138000### 338000###	Activation Only Restoration Only
1	1 – 4 (SLIC) 5 – 9 (ZA8-2)	Point/Zone ###	HSSD	Life Safety	Active	138500### 338500###	Activation Only Restoration Only
				System Integrity	Trouble	138000### 338000###	Activation Only Restoration Only
1	1 – 4 (SLIC) 5 – 9 (ZA8-2)	Point/Zone ###	Heat Detectors	Life Safety	Active	111400### 311400###	Activation Only Restoration Only
				System Integrity	Trouble	138000### 338000###	Activation Only Restoration Only
1	1 – 4 (SLIC) 5 – 9 (ZA8-2)	Point/Zone ###	UV/IR Detectors	Life Safety	Active	111700### 311700###	Activation Only Restoration Only
				System Integrity	Trouble	138000### 338000###	Activation Only Restoration Only
1	1 – 4 (SLIC) 5 – 9 (ZA8-2)	Point/Zone ###	Duct Smoke (Supervisory)	Life Safety	Active	111600### 311600###	Activation Only Restoration Only
				System Integrity	Trouble	138000### 338000###	Activation Only Restoration Only
1	1 – 4 (SLIC) 5 – 9 (ZA8-2)	Point/Zone ###	Water Flow	Life Safety	Active	111300### 311300###	Activation Only Restoration Only
				System Integrity	Trouble	138000### 338000###	Activation Only Restoration Only
1	1 – 4 (SLIC) 5 – 9 (ZA8-2)	Point/Zone ###	Valve Tamper	Life Safety	Active	120300### 320300###	Activation Only Restoration Only
				System Integrity	Trouble	138000### 338000###	Activation Only Restoration Only
1	1 – 4 (SLIC) 5 – 9 (ZA8-2)	Point/Zone ###	Low Pressure	Life Safety	Active	120100### 320100###	Activation Only Restoration Only
				System Integrity	Trouble	138000### 338000###	Activation Only Restoration Only
1	1 – 4 (SLIC) 5 – 9 (ZA8-2)	Point/Zone ###	Toxic Gas	Life Safety	Active	115100### 315100###	Activation Only Restoration Only
				System Integrity	Trouble	138000### 338000###	Activation Only Restoration Only
1	1 – 4 (SLIC) 5 – 9 (ZA8-2)	Point/Zone ###	HVAC Shutdown	Life Safety	Active	116100### 316100###	Activation Only Restoration Only
				System Integrity	Trouble	138000### 338000###	Activation Only Restoration Only

EST QuickStart Configuration Utility Programming Guidelines

Panel	Card	Address	FACP LED Text	Priority	Response Type	String	Send on
1	1 – 4 (SLIC) 5 – 9 (ZA8-2)	Point/Zone ###	RPBFP Flow Switch	Property	Active	115400### 315400###	Activation Only Restoration Only
				System Integrity	Trouble	138000### 338000###	Activation Only Restoration Only
1	1 – 4 (SLIC) 5 – 9 (ZA8-2)	Point/Zone ###	Isolation Module	System Integrity	Active	137300### 337300###	Activation Only Restoration Only
			Control/Relay Mod. (trouble only)	System Integrity	Trouble	138000### 338000###	Activation Only Restoration Only

In addition to the Contact ID data for each individual detection device (intelligent system) or zones (conventional system), the following QuickStart panel pseudo alarms shall be programmed to send alarms to the Central Station.

Panel	Card	Address	Text 1	Text 2	Priority	Response Type	String	Send on
1	0	27	Panel 01, Call	For Service	System Integrity	Trouble	130000000 330000000	Activation Only Restoration Only
1	ZA8-2 #	04	NAC #1	Trouble	System Integrity	Trouble	132100### 332100###	Activation Only Restoration Only
1	ZA8-2 #	08	NAC #2	Trouble	System Integrity	Trouble	132200### 332200###	Activation Only Restoration Only
1	ZA8-2 #	04	NAC #3	Trouble	System Integrity	Trouble	132600### 332600###	Activation Only Restoration Only
1	ZA8-2 #	08	NAC #4	Trouble	System Integrity	Trouble	132700### 332700###	Activation Only Restoration Only
1	SLIC #	270	NAC 270	Circuit #1	System Integrity	Trouble	132100270 332100270	Activation Only Restoration Only
1	SLIC #	271	NAC 271	Circuit #2	System Integrity	Trouble	132200271 332200271	Activation Only Restoration Only
1	14	1	Primary Phone	Line:check Telco	System Integrity	Trouble	135100000 335100000	Activation Only Restoration Only
1	14	2	Secondary Phone	Line:check Telco	System Integrity	Trouble	135200000 335200000	Activation Only Restoration Only
1	15	1	Battery	Charger Fault	System Integrity	Trouble	130900000 330900000	Activation Only Restoration Only
1	15	2	Battery Wiring	or Battery Fault	System Integrity	Trouble	131100000 331100000	Activation Only Restoration Only
1	15	7	Primary AC Power	Failure	System Integrity	Trouble	130100000 330100000	Activation Only Restoration Only
1	15	8	Excessive	Battery Current	System Integrity	Trouble	130900000 330900000	Activation Only Restoration Only

NOTIFIER NFS-640 Programming Guidelines
UDACT PROGRAMMING REFERENCE SHEET

START PROGRAMMMING: To enter Programming mode for UDACT, press **MODE**, then **7764**, then **ENTER/STORE**.

Primary Phone Number: Enter **2849195**. Enter **F** to represent the end of number and in all unused spaces.

00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
2	**8**	**4**	**9**	**1**	**9**	**5**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**

Primary Communication Format: Enter **E** to for Contact ID.

16
E

Primary Account Code: Enter the FACP transmitter number (e.g., 0751 = Building 751 FACP)

17	18	19	20

Primary 24-Hour Test Time: Enter military time.

21	22	23	24
0	**1**	**0**	**0**

Primary Number Test Time Interval: Enter **0** for 24-hours or **1** for 12-hour.

25
0

Secondary Phone Number: Enter **2849646**. Enter **F** to represent the end of number and in all unused spaces.

26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
2	**8**	**4**	**9**	**6**	**4**	**6**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**

Secondary Communication Format: Enter **E** to for Contact ID.

42
E

Secondary Account Code: Enter the FACP transmitter number (e.g., 0751 = Building 751 FACP)

43	44	45	46

Secondary 24-Hour Test Time: Enter military time.

47	48	49	50
0	**1**	**1**	**0**

Secondary Number Test Time Interval: Enter **0** for 24-hours or **1** for 12-hour.

51
0

Start Monitoring Address: Valid entries are 01 through 32 (see Table 3, page 30 in UDACT Instruction Manual PN 50050:G).

52	53
2	**0**

End Monitoring Address: Valid entries are 01 through 32 (see Table 3, page 30 in UDACT Instruction Manual PN 50050:G).

54	55
3	**2**

UDACT Communication Selection: Enter **0** to disable UDACT communication; enter **4** for point reporting receive/transmit. Also need to enable UDACT in NFS-640 programming when to use.

56
4

Backup Reporting: Enter **0** to have secondary phone number act as backup only.

57
0

Touchtone/Rotary Select: Enter **0** for touchtone dialing.

58
0

NOTIFIER NFS-640 Programming Guidelines

Make/Break Ratio: If rotary dialing is selected in Address 58; Enter 0 for a 67/73 make/break ratio; 1 for a 62/38 make/break ratio.

59
0

Address (60): Leave default of **0**.

60
0

Address (61): Leave default of **0**.

61
0

AC Loss Reporting Delay: Enter **0** for no time delay after AC loss; **1** for 6-hour delay; **3** for 8-hour delay, etc.

62
1

Host Panel ID: Enter **5** for NFS-640

63
5

Loop Number: For Contact ID format only. Factory default is **00**.

64	65
0	**0**

Secondary Account Code: For Contact ID format only. These entries apply to the general reports only (i.e., general alarm, general trouble, general supervisory). Factory default is 000. Maximum value is 999. Refer to "Reporting Formats" on page 56 in UDACT Instruction Manual for additional information.

66	67	68
0	**0**	**0**

Programming Event Codes (69-208): The type of reports and 'event codes' that are sent to the Central Station are in Table 4 through Table 9 in the UDACT Instruction Manual. The selections made for the Primary Central Station Number Communication Format (address 16) and the Secondary Central Station Number Communication Format (address 42) automatically program addresses 69-208 with factory default selections.

Ademco Contact ID – Primary Number Event Codes

Address	Description	Setting	Notes
69-71	Primary # General Alarm Code	000	Default setting is 110. See Note 1.
72-74	Primary # Zone/Point Alarm Code	110	
75-77	Primary # General Supervisory Code	000	Default setting is 200. See Note 1.
78-80	Primary # Zone/Point Supervisory Code	200	
81-83	Primary # General Fault Code	000	Default setting is 300. See Note 1.
84-86	Primary # AC Fault Code	301	
87-89	Primary # Zone/Point Fault Code	380	
90-92	Primary # Low Battery Fault code	302	
93-95	Primary # Telco Primary Line Fault Code	351	
96-98	Primary # Telco Secondary Line Fault Code	352	
99-101	Primary # NAC Fault Code	321	
102-104	Primary # Comm. Trouble Primary # Code	354	
105-107	Primary # Comm. Trouble Secondary # Code	354	
108-110	Primary # 485 Comm. Trouble Code	300	
111-113	Primary # System Off Normal Code	308	
114-116	Primary # UDACT Off Normal Code	350	
117-119	Primary # System 24 Hour Test	602	
120-122	Primary # System 24 Hour Test w/active event	608	
123-125	Primary # Manual Test Message	601	

Note 1: Zero entries prevent the transmission of the report to the Central Station. General alarm, general supervisory, and general trouble codes are 1st order alarms that are sent to the Central Station before the point Contact ID alarm, which nullifies the value of the Contact ID information at the Central Station. Entering zero entries prohibits two alarms for the same point from appearing at the Central Station.

NOTIFIER NFS-640 Programming Guidelines

Ademco Contact ID – Secondary Number Event Codes

Address	Description	Setting	Notes
139-141	Secondary # General Alarm Code	000	Default setting is 110. See Note 1.
142-144	Secondary # Zone/Point Alarm Code	110	
145-147	Secondary # General Supervisory Code	000	Default setting is 200. See Note 1.
148-150	Secondary # Zone/Point Supervisory Code	200	
151-153	Secondary # General Fault Code	000	Default setting is 300. See Note 1.
154-156	Secondary # AC Fault Code	301	
157-159	Secondary # Zone/Point Fault Code	380	
160-162	Secondary # Low Battery Fault code	302	
163-165	Secondary # Telco Primary Line Fault Code	351	
166-168	Secondary # Telco Secondary Line Fault Code	352	
169-171	Secondary # NAC Fault Code	321	
172-174	Secondary # Comm. Trouble Primary # Code	354	
175-177	Secondary # Comm. Trouble Secondary # Code	354	
178-180	Secondary # 485 Comm. Trouble Code	300	
181-183	Secondary # System Off Normal Code	308	
184-186	Secondary # UDACT Off Normal Code	350	
187-189	Secondary # System 24 Hour Test	602	
190-192	Secondary # System 24 Hour Test w/active event	608	
193-195	Secondary # Manual Test Message	601	

Note 1: Zero entries prevent the transmission of the report to the Central Station. General alarm, general supervisory, and general trouble codes are 1st order alarms that are sent to the Central Station before the point Contact ID alarm, which nullifies the value of the Contact ID information at the Central Station. Entering zero entries prohibits two alarms for the same point from appearing at the Central Station.

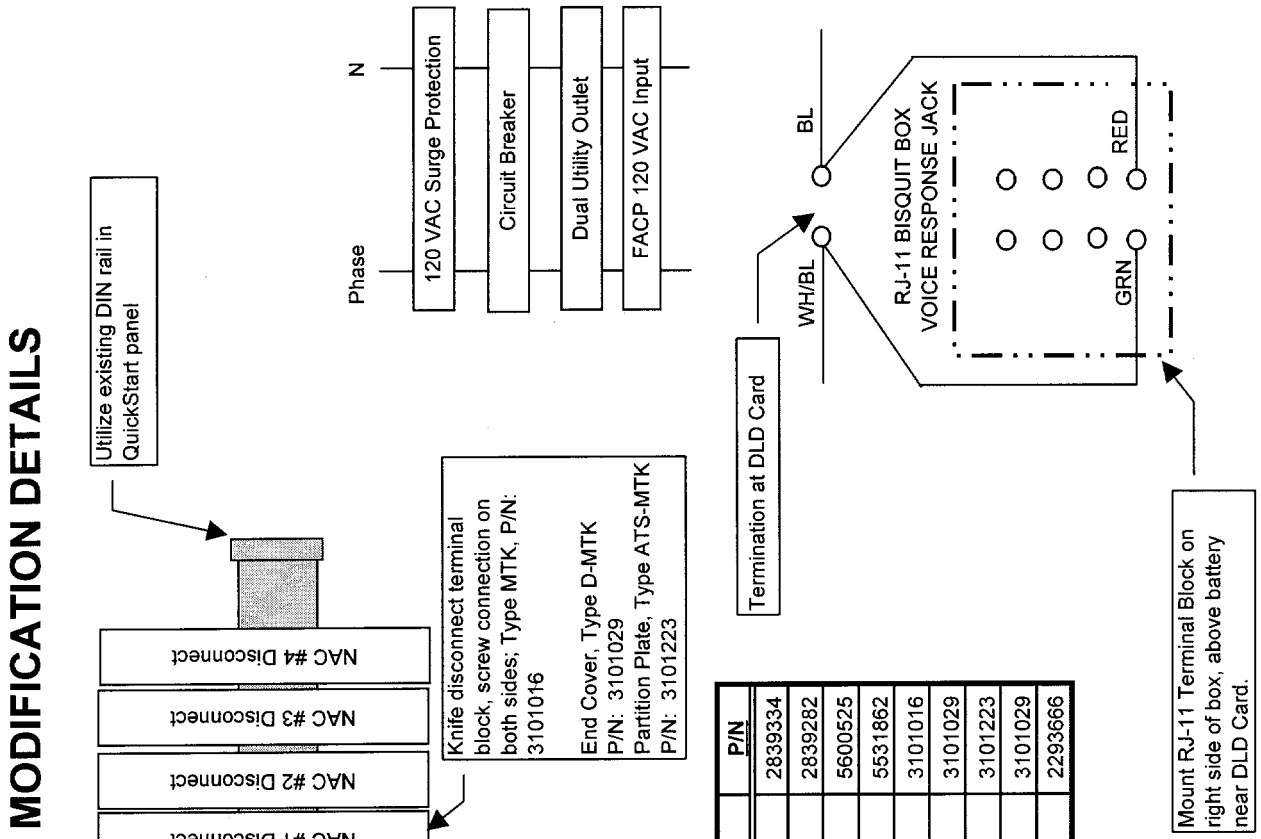
Programming the Real-time Clock: Entering an address greater than 209 will cause a display of the current time. On power up, the clock will start running from the factory setting of 00:01 (military time).

Setting the hour: The far left digit will be flashing, indicating that this is the first digit to be programmed. Select a digit then press **ENTER/STORE**. The digit 2nd from the left will start flashing. Select a digit then press **ENTER/STORE**. Hours setting is complete.

Setting the minutes: With the digit 2nd from the right flashing, select a digit then press **ENTER/STORE**. The digit on the far right will start flashing. Select a digit then press **ENTER/STORE**. Minutes setting is complete.

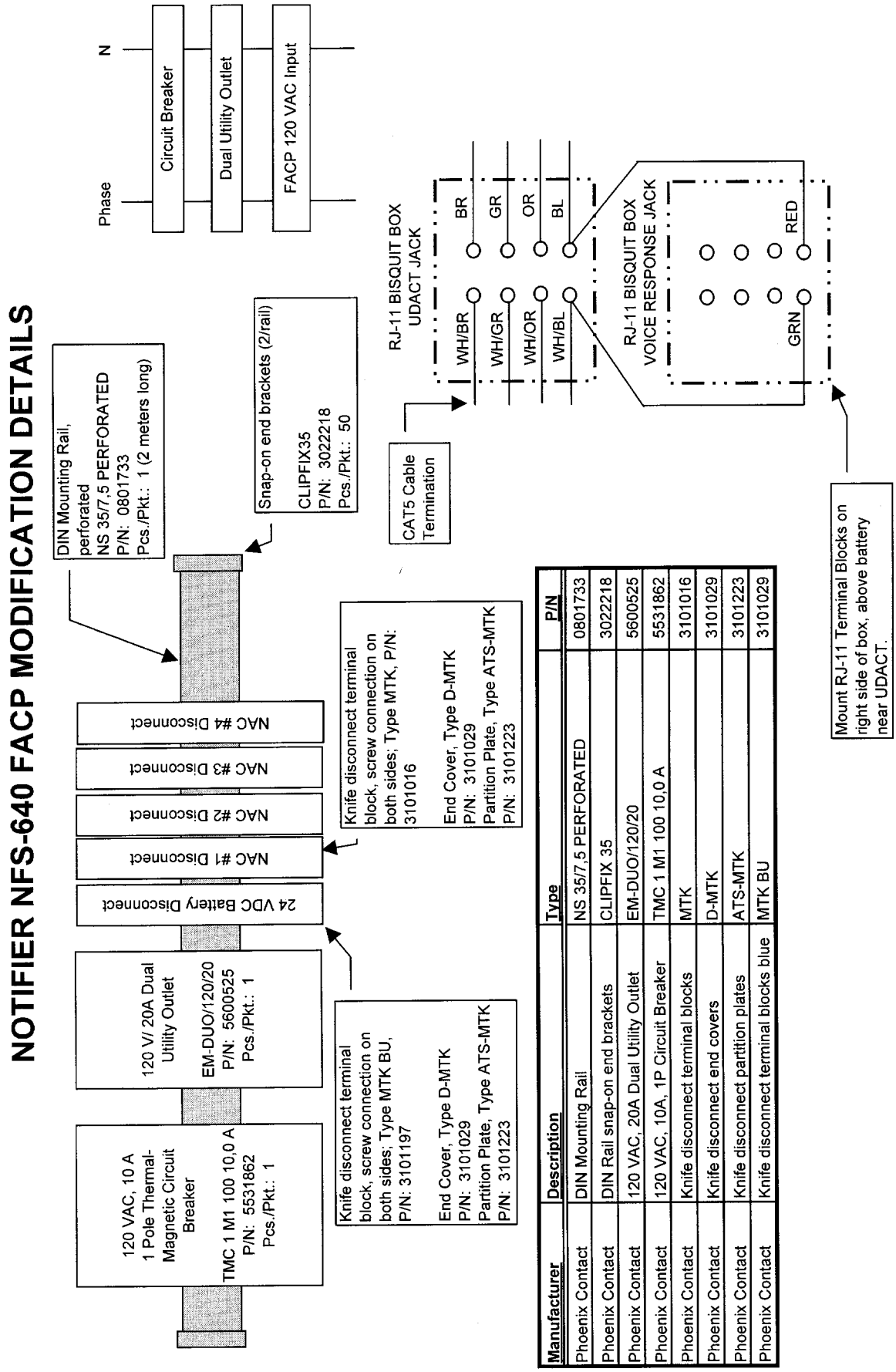
END PROGRAMMING: Exit Programming Mode by pressing mode, followed by 6676, then press **ENTER/STORE**.

EST QUICKSTART FACP MODIFICATION DETAILS



Manufacturer	Description	Type	P/N
Phoenix Contact	120 VAC Surge Protection plug	PT 2-PE/S-120AC-ST	2839334
Phoenix Contact	120 VAC Surge Protection base	PT-BE/FM	2839282
Phoenix Contact	120 VAC, 20A Dual Utility Outlet	EM-DUO/120/20	5600525
Phoenix Contact	120 VAC, 10A, 1P Circuit Breaker	TMC 1 M1 100 10,0 A	5531862
Phoenix Contact	Knife disconnect terminal blocks	MTK	3101016
Phoenix Contact	Knife disconnect end covers	D-MTK	3101029
Phoenix Contact	Knife disconnect partition plates	ATS-MTK	3101223
Phoenix Contact	Knife disconnect terminal blocks blue	MTK BU	3101029
Phoenix Contact	RS232 Computer Connection	UM 45-D 9 SUB/B/ZFKDS	2293666

NOTIFIER NFS-640 FACP MODIFICATION DETAILS



Manufacturer	Description	Type	P/N
Phoenix Contact	DIN Mounting Rail	NS 35/7,5 PERFORATED	0801733
Phoenix Contact	DIN Rail snap-on end brackets	CLIPFIX 35	3022218
Phoenix Contact	120 VAC, 20A Dual Utility Outlet	EM-DUO/120/20	5600525
Phoenix Contact	120 VAC, 10A, 1P Circuit Breaker	TMC 1 M1 100 10,0 A	5531862
Phoenix Contact	Knife disconnect terminal blocks	MTK	3101016
Phoenix Contact	Knife disconnect end covers	D-MTK	3101029
Phoenix Contact	Knife disconnect partition plates	ATS-MTK	3101223
Phoenix Contact	Knife disconnect terminal blocks blue	MTK BU	3101029

FIRE PROTECTION SYSTEMS
Request for Acceptance Testing

FORM INSTRUCTIONS: The Prime Contractor shall complete this form whenever modifications or new construction occur on any fire protection system to schedule Fire Alarm Maintenance (10842-1) personnel to witness the final commissioning of the system(s) by the contractor(s) that installed the system(s). **Failure of a system to pass the acceptance test will require a resubmittal of this form.**

STEP 1 – PROJECT INFORMATION: Fill out the information requested below pertaining to the work to be performed.

Prime Contractor Requester: _____ **Phone #:** _____

Prime Contractor Company Name: _____ **Cell Phone / Pager:** _____

Building: _____ **Work Location:** _____

Contract #: _____ **Project / Task #:** _____

	COMPANY NAME	CONTACT NAME	PHONE / PAGER NUMBERS
Electrical Contractor:			
Fire Alarm Sub:			
HSSD/Fire Suppression Sub:			
Fire Protection Sprinkler Sub:			
SDR:			
Electrical SCO:			
Mechanical SCO:			

FIRE PROTECTION SYSTEMS REQUIRING ACCEPTANCE TESTING (check all that apply)

DETECTION / SUPPRESSION SYSTEMS

- ☐ Fire Alarm System
- ☐ Fire Protection Sprinkler System
- ☐ Fire Suppression System (e.g. FM-200)
- ☐ Air Sampling (HSSD) System

FIRE SAFETY FUNCTION CONTROLS

- ☐ HVAC Control Systems (e.g., AHU shutdown, fire dampers)
- ☐ Power Shunt Trip of non Fire Protection systems
- ☐ Elevator Controls
- ☐ Smoke Removal Systems

TYPE OF FIRE ALARM SYSTEM TEST

- ☐ Test for Occupancy (complete building test)
- ☐ Partial Test (test of modified space)
- ☐ Device (IDC, SLC, NAC) Additions / Relocations

TYPE OF SPRINKLER SYSTEM TEST

- ☐ New Sprinkler System Installation
- ☐ Additions to Sprinkler System
- ☐ Removal / Relocation of Sprinkler System components

STEP 2 – DELIVERABLES: Provide the deliverables listed below to the designated SNL Fire Protection Engineer prior to scheduling test.

FIRE ALARM SYSTEM

- ☐ Deliver a set of the as built or red-lined Fire Alarm System drawings that depict the system(s) to be acceptance tested with Notification Appliance Ciruit (NAC) AC decibel test results (if applicable) noted on plans to the designated SNL-NM Fire Protection Engineer.
- ☐ Electronic copy of the fire alarm control panel programming has been e-mailed to the designated SNL-NM Fire Protection Engineer.
- ☐ Completed Fire Alarm System – Quality Assurance Checklist (attach to this form)

FIRE PROTECTION SPRINKLER SYSTEM

- ☐ Sprinkler system has been hydrostatic tested (attach test results). Refer to Standard Specification, Section 15310 “Automatic Sprinklers and Water Based Fire Protection Systems”, Part 3.10 for details.
- ☐ Backflow preventor has been tested and certified (for new installations only). Attach certification documentation to this form.
- ☐ Completed Fire Protection System – Quality Assurance Checklists (attach to this form)

STEP 3 – APPROVAL SIGNATURES: Obtain signatures from Sandia Construction Observer(s) and SNL Fire Protection Engineer prior to requesting Acceptance Test date/time.

I acknowledge by my signature below that the fire alarm system, fire protection system, sub-system(s), and control system(s) are ready to be functionally acceptance tested and commissioned by the Prime Contractor and/or his subcontractors.

Electrical SCO: _____ Date: _____

Mechanical SCO: _____ Date: _____

I acknowledge by my signature below that the programming at the Fire Alarm Monitoring Central Station has been completed and that any programming required at the fire alarm control panel has been reviewed or completed.

SNL Fire Protection Engineer: _____ Date: _____

STEP 4 – SCHEDULE TEST: Take form to Maintenance Planner to schedule Acceptance Test dates/times. Allow 2 days for Maintenance Planner to schedule date/time for SNL personnel to witness Acceptance Test.

The Prime Contractor shall be responsible for completing the ACCEPTANCE TEST SCHEDULE below and for coordinating the testing dates/times of each of the following systems with each subcontractor and with SNL Maintenance Personnel. The acceptance tests shall be conducted in the order listed below:

1. Fire Safety Systems (e.g., HVAC Controls, elevator controls, smoke removal)
2. Air Sampling (HSSD) / Fire Suppression subsystems (e.g., Analaser, fire suppression release panels)
3. Fire Protection Sprinkler System / Fire Alarm System

Each system test shall be scheduled at different times than the other required tests. Only the fire alarm and fire protection systems can be scheduled at the same time. The Sandia points of contact to arrange test schedules with SNL personnel are listed below.

	MAINTENANCE PLANNER	PHONE NUMBER	PAGER
Fire Alarm/Sprinkler Systems Electricians and Pipe Fitters	Gerald Roudabush	844-6179	530-7314
	Fred Webb (backup)	284-6240	530-2917
	Bill Deaton (backup)	845-3101	561-0044
Building Mechanic (HVAC controls)	Gerald Walters	844-3034	540-7616
Elevator Controls	Luis R. Apodaca	844-3725	530-4989

ACCEPTANCE TEST SCHEDULE

Contractor Requested Date(s): _____ **Contractor Requested Start Time(s):** _____

SYSTEM	TEST DATE	START TIME	ESTIMATED COMPLETION TIME	TEST MEETING LOCATION
HVAC Controls / Smoke Removal				
Elevator Controls				
Air Sampling System (HSSD)				
Fire Suppression System (FM-200)				
Fire Alarm / Protection Sprinkler System				

I acknowledge by my signature below that Sandia maintenance personnel have been scheduled to witness the commissioning tests at the dates, times, and locations listed above; and a copy of this completed form has delivered to Gary Bultmann and Paul Smith.

Maintenance Planner: _____ MAXIMO WO #'s: _____

STEP 5 – FORM DISTRIBUTION: Contractor delivers original form to Sandia Construction Observer (SCO). SCO will distribute copies to the project SDR and SCOs.

Copy To:	Organization	Mail Stop
Gary Bultmann	10842-1	0934
Paul R. Smith	10863	0945
Sandia Delegated Representative (SDR)	10827	0942
Electrical Sandia Construction Observer (SCO)	10827	0942
Mechanical Sandia Construction Observer (SCO)	10827	0942

FIRE ALARM SYSTEM
Quality Assurance Checklist

Name(s) of Inspector / Tester: _____ **Company/Org.:** _____

INSTRUCTIONS: Enter date, comments, and test data values where indicated. If an inspection/test activity is not relevant to the project, note "NA" in the Comments column.
The inspection/test items listed below are not all inclusive. All requirements of the construction specification shall be performed.

	Component Inspection/Test Activity	Date	Comments
1.0	**FIRE ALARM CONTROL PANEL (FACP), ANNUNCIATORS**		
1.1	FACP and annunciators have been flush or semi-flush mounted prior to completing dry wall installation.		
1.2	FACP goes into trouble when AC power is removed.		
1.3	FACP has a dedicated 120 VAC 20A circuit that is labeled as "FA".		
1.4	There are no 120 VAC circuits inside FACP other than panel AC power.		
1.5	Cables are neatly bundled and secured inside FACP.		
1.6	NAC load amperage readings: NAC #1: _____ amps NAC #3: _____ amps NAC #2: _____ amps NAC #4: _____ amps Amperage readings should not exceed 2 amps (1 amp for NAC #2, SLIC card address 271 on the EST QuickStart FACP).		
2.0	**INITIATING DEVICES**		
2.1	Back boxes for pull stations have been flush or semi-flush mounted prior to completing dry wall installation.		
2.2	Detectors are mounted securely.		
2.3	Manual pull stations are mounted 4 feet above finished floor in accessible, visible location and within 5 feet of the exit doorway opening.		
2.4	Smoke and heat detectors are mounted below deck in rooms without a ceiling.		
2.5	Duct smoke detectors are wired to be reset at FACP.		
2.6	Duct smoke detectors are accessible for maintenance.		
2.7	Duct smoke detectors are installed in weatherproof enclosures or rated for outdoor use when installed in exterior locations.		
2.8	A remote LED Indicator is installed on the exterior of EST duct detector housings and on the ceiling for duct detectors installed above ceilings.		
2.9	A Remote Test Station (RTS) is installed in proper location for each Notifier or conventional duct smoke detector.		
2.10	Each alarm initiating device (pull stations, smoke and heat detectors, water flow indicator, etc.) activates all building notification appliances.		
3.0	**NOTIFICATION APPLIANCES AND NAC POWER SUPPLIES**		
3.1	Back boxes for notification appliances have been flush or semi-flush mounted prior to completing dry wall installation.		
3.2	Notification appliances are mounted securely.		
3.3	Notification appliances are mounted on wall between 80 and 96 inches above finished floor. Appliances in computer rooms and labs should be mounted at 96 inches. Flush mounting is not permitted.		
3.4	NAC power supply goes into trouble when AC power is removed.		
3.5	Toggle switch installed inside power supply to isolate 120 VAC power.		
3.6	NAC power supply has a dedicated 120 VAC 20A circuit that is labeled as "FA".		
3.7	NAC load amperage readings on NAC power supply outputs: Power Supply: _____ Power Supply: _____ Power Supply: _____ Output #1: _____ A Output #1: _____ A Output #1: _____ A Output #2: _____ A Output #2: _____ A Output #2: _____ A Output #3: _____ A Output #3: _____ A Output #3: _____ A Output #4: _____ A Output #4: _____ A Output #4: _____ A Amperage readings should not exceed 2 amps per output.		List load readings here for other NAC power supplies.
3.8	Multitone horns have dip switches set for the "bell" tone setting and the "STANDARD" setting in office/assembly areas and stairwells; and set on "HI" in all other areas		
3.9	Factory jumpers in Wheelock multitone horn/strobes have been replace with		

FIRE ALARM SYSTEM
Quality Assurance Checklist

	#14 jumpers.		
	Component Inspection/Test Activity	**Date**	**Comments**
3.10	Decibel levels for audible notification appliances are a minimum of 15 dB above ambient.		Note deficiencies in table “Locations with Inadequate Decibels Levels”.
4.0	**FIRE SAFETY FUNCTIONS**		
4.1	Upon activation of duct smoke detector on AHU system, the AHU shuts down and AHU system fire smoke dampers close.		
4.2	Upon activation of smoke detector in elevator lobbies (with exception of ground floor) the elevator is routed to the primary ground level location.		
4.3	Upon activation of smoke detector in ground level elevator lobby, the elevator is routed to the alternate location.		
4.4	Upon general building alarm, all magnetic door holders release their respective doors.		
4.5	Upon water flow detection, building smoke removal systems are activated.		
5.0	**RACEWAY / CABLE INSTALLATION**		
5.1	Conduit is strapped per specification and NEC.		
5.2	Mounting boxes for fire alarm devices are mounted securely.		
5.3	Fire stopping is provided where conduit penetrates rated firewalls.		
5.4	Conduit does not have over 360 degrees worth of bends.		
5.5	Conduit fittings are tight.		
5.6	Fire alarm conduit system color-coding has been installed. (Brown tape)		
5.7	No KO's are missing in J-boxes, pull boxes, and enclosures.		
5.8	Fire alarm J-box and pull box covers are painted red.		
5.9	A pull box or wireway has been installed above FACP in an accessible location		
5.10	Proper fire alarm cables, color code, type, and size. Verify SLC cable has blue outer jacket and NAC cable has red jacket.		
6.0	**LABELING**		
6.1	EST SLC cables are labeled “IN” and “OUT” at all termination points.		
6.2	IDC cables have the Card and Address Numbers at all termination points.		
6.3	NAC cables have the Zone/Output Number at all termination points.		
6.4	Fire alarm 120 VAC circuits are on a dedicated 20A branch circuit that has been identified as “FA” in the power panel.		
6.5	Each initiating device is labeled with either the intelligent address number or the card/address number for conventional devices.		
6.6	Each notification appliance is labeled with the FACP NAC number or the power supply/output number.		
6.7	Fire alarm terminal cabinets and notification appliance have mycarta labels identifying the enclosure.		
7.0	**SPRINKLER SYSTEM CONNECTION TO FIRE ALARM SYSTEM**		
7.1	Tamper switches are properly installed and adjusted. Alarm signal is sent to FACP within 2 revolutions from valves normal position.		
7.2	The alarm from the flow switch is received at FACP in seconds.		
8.0	**CLOSE-OUT SUBMITTALS**		
8.1	E-mail as-built fire alarm AutoCAD files to designated Fire Protection Engineer.		
8.2	E-mail final FACP programming to designated Fire Protection Engineer.		

LOCATIONS WITH INADEQUATE DECIBEL LEVELS

Location	**dB Level**

ATTENTION

IN CASE OF FIRE
CALL 911

FIRE ALARM SYSTEM IS NOT OPERATIONAL AS OF:

DATE: _____ **TIME:** _____